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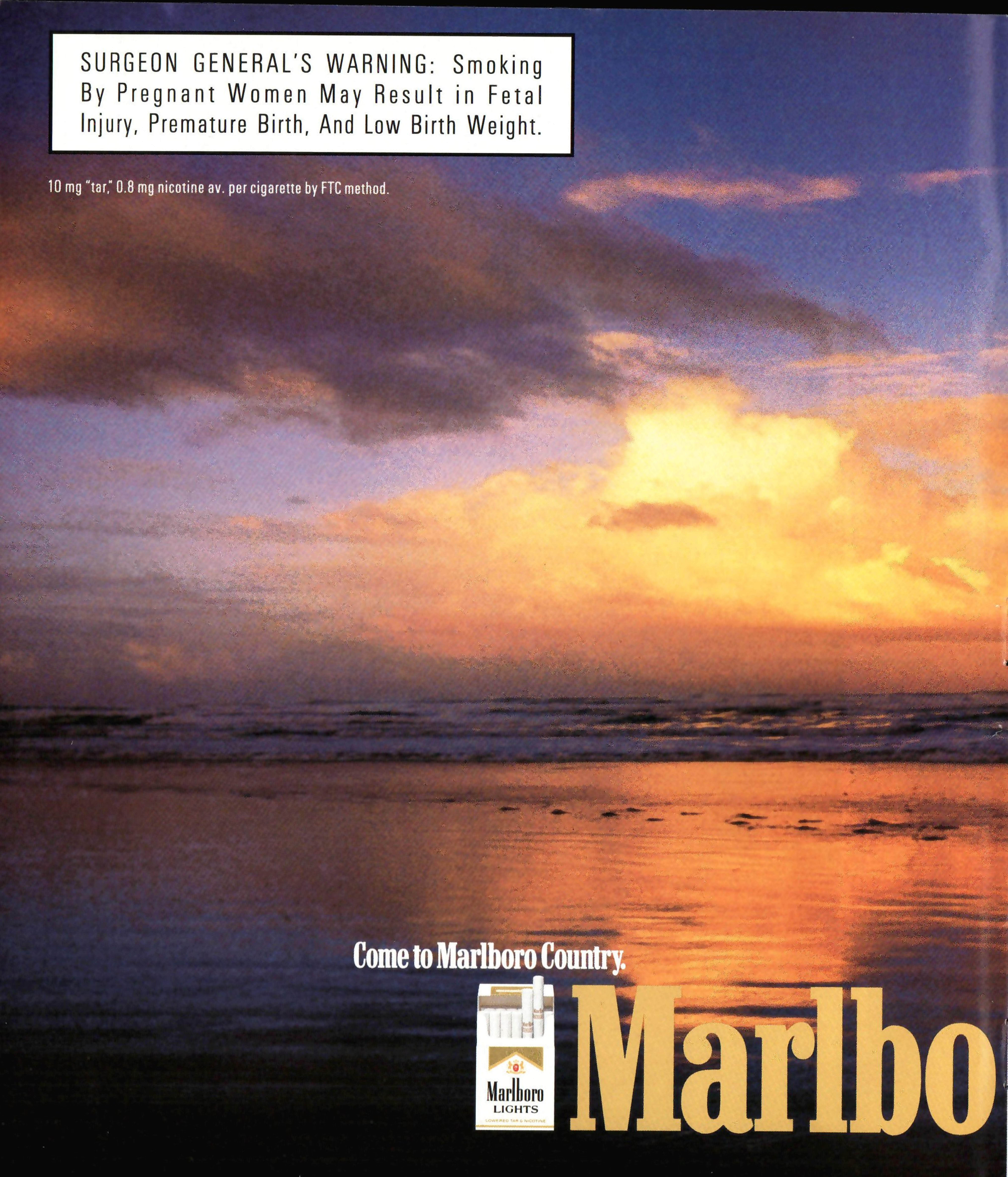

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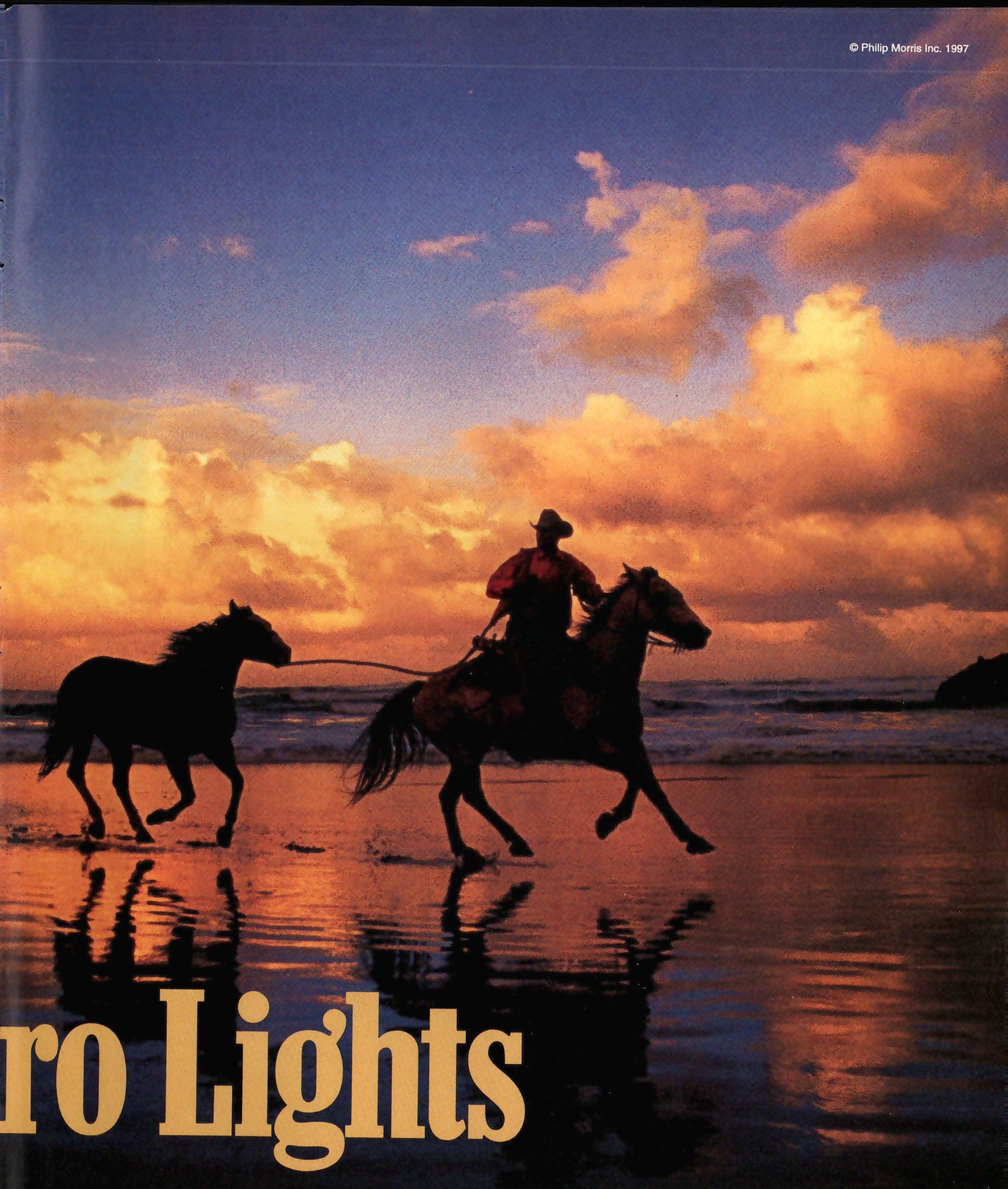

POPULAR HOT RODDING

SEPTEMBER 1997
VOLUME 37 NO. 9

ON THE COVER:

PHR visited what is probably the finest pre-owned, specialty car salon on the planet — Boyds Hot Rods and Collectable Cars in Stanton, California. We pulled a few fine specimens from the spotless 6,500 square-foot showroom for our cover scenario. Following in the Boyds tradition, Sales Manager Jim Stecher wore his favorite Hawaiian shirt to seal a deal with Bill Peach and his pretty companion, Kate Mintz. *Photo by Eric Geisert.*

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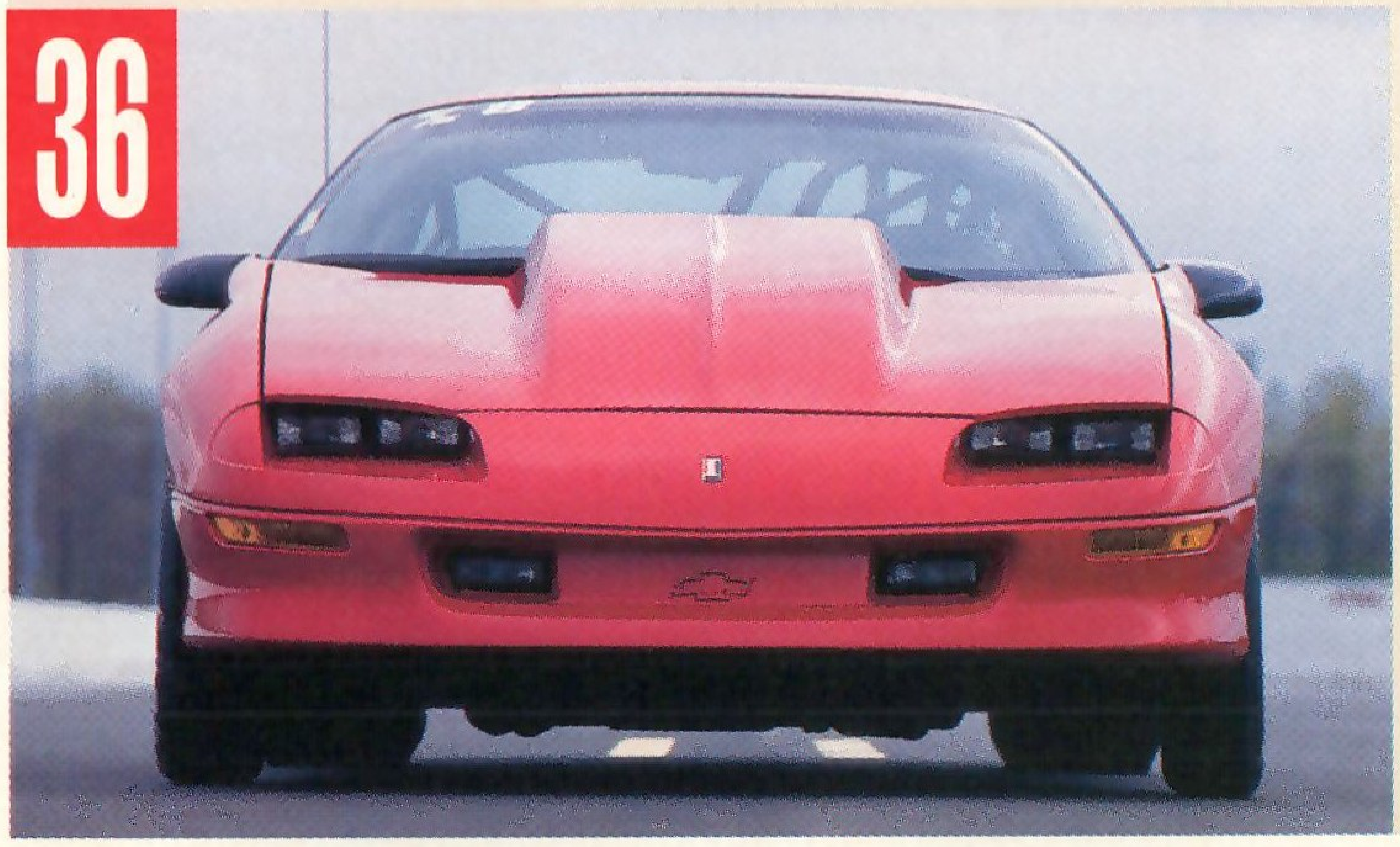
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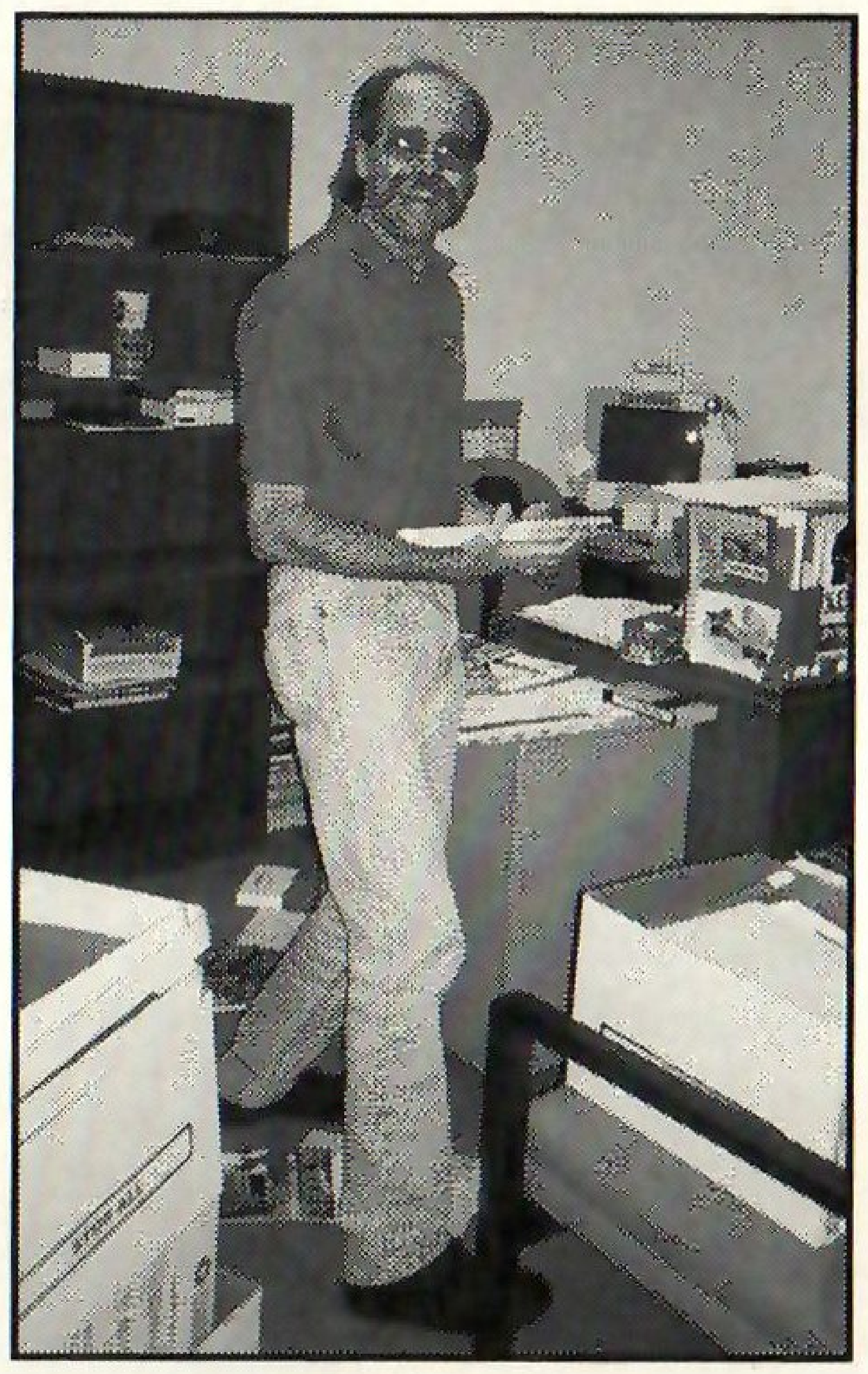
BETWEEN ROUNDS

BY RANDY FISH

The Mobile Mixed Bag

The way things go in this line of work, sometimes you have to get behind to get ahead. As the photo shows, I got behind recently when we moved into different offices. I'm still trippin' over unpacked stuff! Otherwise, *PHR* has gone through some growing pains recently (none to worry, they're the pleasant type). As you may have noticed, the ratio of color pages for editorial as opposed to color for advertising got a little out of whack. During that time, we just kept juggling our normal flow of editorial, page layouts, and ads. Actually, we really don't mind color ads — we love 'em! The hard part comes in keeping up with the advertisers' latest products. That's what strengthens the relationship and keeps the idea mill churning, with regards to future editorial coverage. More advertising generally relates to more dialog between editors and manufacturers — which in turn, relates to more interesting stories for our readers.



Another thing you might have noticed is a missing installment on "Project Good From Far (and far from good)." Travel scheduling and other commitments got in the way of Cam bringing his next hit to print. Things will be back on track for the October issue. We're looking at a possible cover shoot, as the actual "heart transplant" takes place. But before things get that far, lots more has to be done to bring this "Phony Pony" closer to "Sterling Stallion" status. Stay tuned, this real-world makeover has us all stoked!

For this go-around, we have what amounts to the hottest (and probably the most popular) small-block Chevy buildup. We watched as Gail Trent and crew (at American Speed) assembled their version of a very streetable, 460hp (!), small-block stroker motor. Gail developed this exciting package for his growing list of street rod customers, who want gonzo power and mega reliability. This package offers plenty of trick stuff, important machining procedures, and matched components that are designed to "go the distance." It's sort of a "Have your cake and eat it too" type of powerplant. How cool is that?

Having covered eight- and nine-inch rear ends from the Ford camp, we decided to lift the cover from a GM 12-bolt for your chewing pleasure. We couldn't begin to count how many of them are in service, so this should help with your next "performance posterior" rebuild. You'll learn some very important tips on assembly, as well as correct break-in procedures. Our subtitle, "Differential Demystification" should tell you how we like to take the "mystery" out of important topics, as well as teach you something along the way.

Switching gears (so to speak) in the direction of horsepower again, check out the power gains from our Kenne Bell-prepped, Buick Grand National V-6 upgrade! Man, do these guys have a program for power, or what? Granted, not everyone has one of these kicking around, but you might want one after reading our story. We've got another hit coming on this one, so stay tuned.

We're also checking in on the National Muscle Car Association, as we followed their merry caravan to Norwalk, Ohio. A few teams are still experiencing early season woes, but things are really shaping up. The wild wheelstands, nitrous blasts, and computer tuning stations all help give the fans a good dose of "dynamite doorslammer dancing." As we like to say, "NMCA Racers Go All The Way," or the full quarter-mile, if you will. They like keeping their foot in it for 1,320 feet at a time — just the way drag racing was intended to be! Naturally, we'll keep you up to date on every bit of NMCA action throughout the year. For now though, I hope you enjoy reading our "Mobile Mixed Bag." Above all, make sure you keep it inside the lines — with the shiny side up! ▨

MAILBOX

We're waiting to hear from you! Letters will be printed as space permits and may be edited for content and clarity. Send material to: Popular Hot Rodding Mailbox, 774 S. Placentia Ave., Placentia, CA 92870. Popular Hot Rodding and McMullen Argus Publishing assumes no responsibility for errors in publication.

SCHOOL OF POWER

I am a very mechanically-minded individual with a desire to excel in the high performance industry. My problem is in finding a school that offers this training, not the typical, trade school mechanic skills.

I've been considering the School of Automotive Machinists in Houston, a school that I found in your magazine. They sent me a great kit, but I'd like a few more choices.

John Reed
address withheld

If this letter sounds familiar, it's because we get so many of them just like it. Luckily, we're finding new schools with a motorsports emphasis and we're glad to pass them along to our readers.

One program at Rowan-Cabarrus Community College in North Carolina offers a two-year, Associates degree in Motor Sports Technology Management. From the location, we'd say job placement within a NASCAR team wouldn't be too tough. A joint program based just 20 minutes up the road from Charlotte Motor Speedway is under development between Mitchell Community College and Davidson County Community College. The NASCAR boom has teams hiring ex-aerospace people and those who used to work for defense contractors, so some true-to-the-field training couldn't hurt.

Northwest College near Cleveland, Ohio offers an incredible program in high performance technology which involves fuel injection, cylinder head development, and more. Look for a story on this soon in PHR.

PROVIDE THE PRICE

I've been an avid reader of PHR for many years and especially enjoy the project articles such as "Project Road Rocket" and "Build a Ford 512 Stroker." However, I've never seen a dollar cost associated with the respective projects.

There are probably price differences from company to company for things such as machine work, but the price of the parts and upgrades should remain constant enough where a "ballpark" estimate could be given. I've seen a lot of projects I'd be interested in doing, but without knowing what I can expect to pay, it's still in the dream stage.

I know the saying, "If you have to ask, then it is too much." Is this the case?

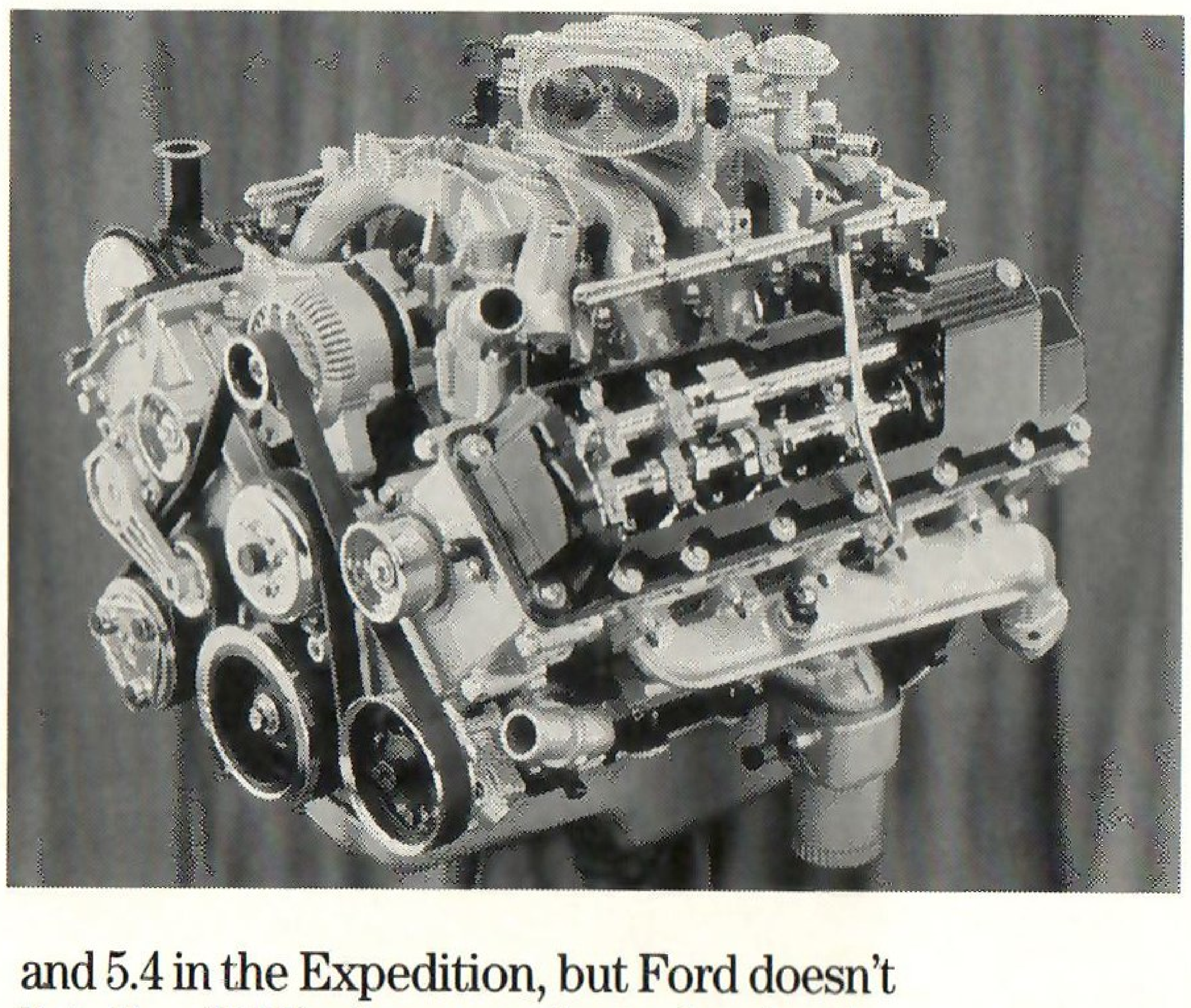
Pat Perry
Dallas, TX

In a few cases, such as with the extremely high tech stuff or full-race examples, the prices are obviously high. But in the case of everyday performance parts found in "New Products" and the tidbit items you see in "Speed Reading," we omit the expense due to ever-changing price structures and the competitive mail-order market. Your local speed shop can make you a good offer, also, so it wouldn't be responsible to tell you guys exactly what to pay.

Regardless, we should always make an effort to provide a ballpark number or average street price in a tech story. Lately, we've been making an extra effort and will continue to do so.

THE OTHER V-10

I'm curious about Ford's new Triton V-10 engine. It's available in the new Econoline van as an option, but I can't find any horsepower or torque figures. I know it's 6.8L (415 ci) and is a modular powerplant related to the 4.6 from the Mustang and 5.4 in the Expedition, but Ford doesn't list the V-10's bore and stroke in the brochures! Geez, come on guys.



Is this engine cross-bolted like in the '60s era engines? They sound rugged and I'm impressed with the 100,000-mile tune-up interval, but I'm still an avid fan of the tried-n-true 460 V-8.

Tom DeGideo
Lansdale, PA

We called Dennis Holyoak, Ford's design manager for the Triton program, who says the V-10 is as trick as you figured, Tom. You're correct in that it only makes a bit more power than the old 460, but it does so with only a 3.55-inch bore and a 4.1-inch stroke. This light and efficient engine uses the same aluminum cylinder head as the other Triton engines with one cylinder added on each side (due to identical, 100mm bore spacing), hence the term "modular." Compared to Chrysler's V-10s, the Ford has a balance shaft in the left-bank head and features a smoother, even firing order for a better exhaust sound. As for the 100,000-mile service interval, reliable electronic ignition gets the credit, especially with its coil-on plug configuration (no long plug wires to deteriorate...) and platinum-tipped spark plugs. For an extreme test, Ford configured a vehicle with the Triton V-10 and pulled a 36,000-pound load for 100,000 miles — after disassembly, everything looked fantastic!

We've driven the Econoline van with the V-10 and its an incredible package with unprecedented throttle response, regardless of load. The Bob Bondurant driving school uses them on their infamous van rides to full effect (not like that needed a big change) and if you comb the junkyard, you could find one heck of a street rod project engine and a ton of work.

And, yes, it does feature cross-bolted main caps.

CLIP KNOWLEDGE

I have a '51 Chevy sedan delivery and I don't want to use a Mustang II front end. I would like to use a GM front clip, but don't know what year works best. Do you guys know someone who's done this before?

D. Bernat
Bloomfield, New Jersey

You need to call Fat Man Fabrications in Charlotte, NC (704-545-0369), as they are an industry leader in both Ford and GM chassis, suspension, and brakes. Not only can they tell you what fits, but they can sell it to you, too.

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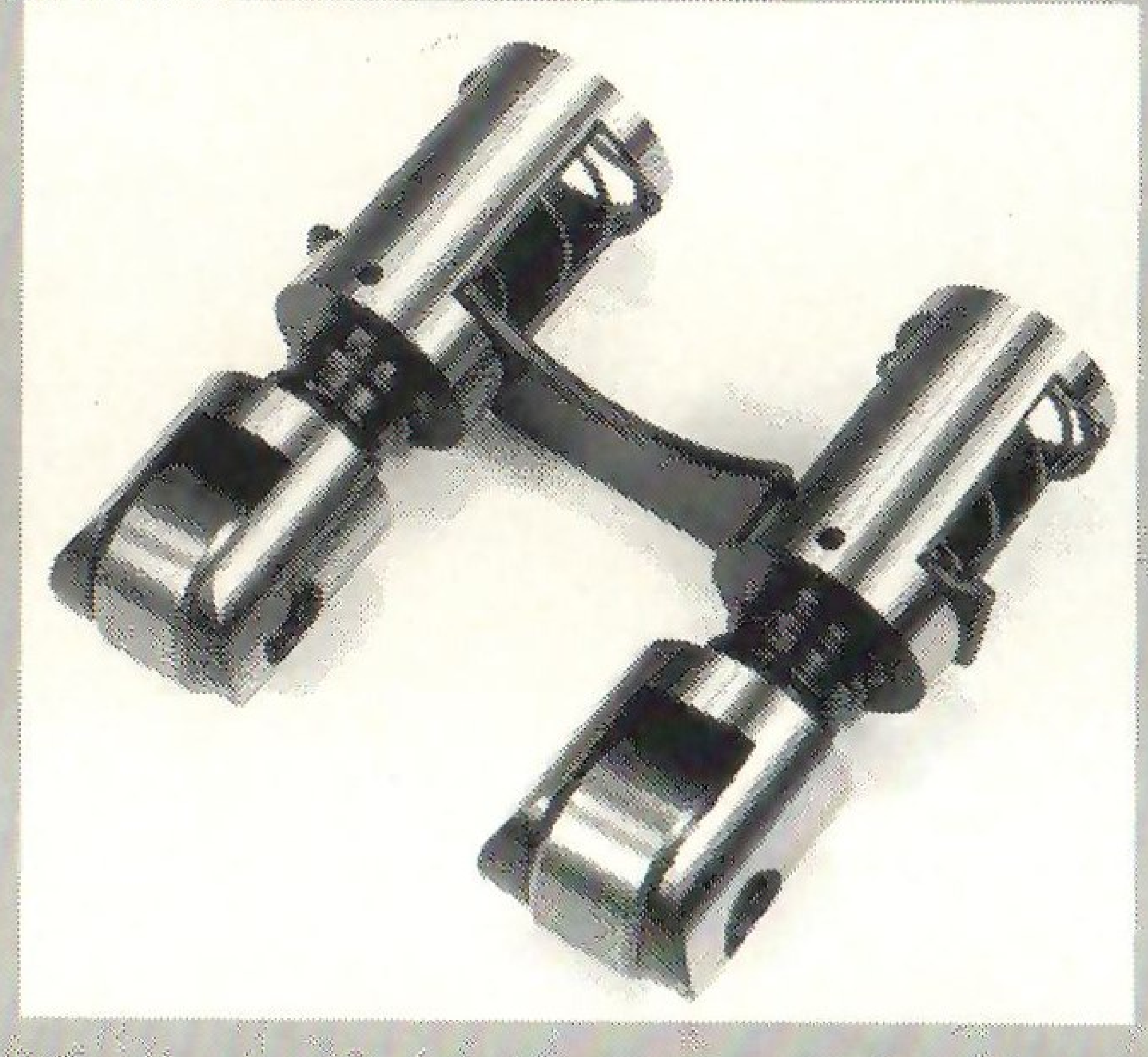
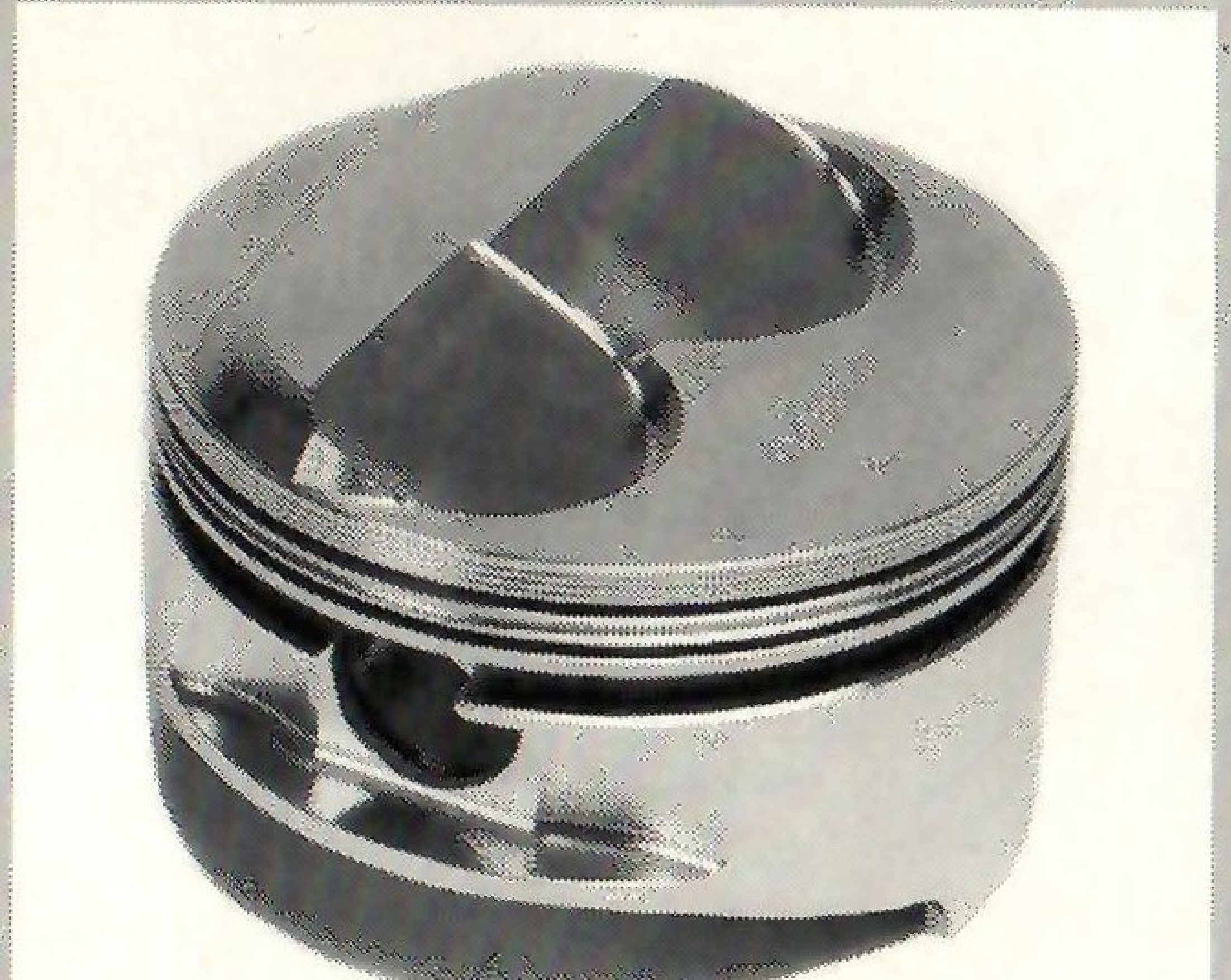
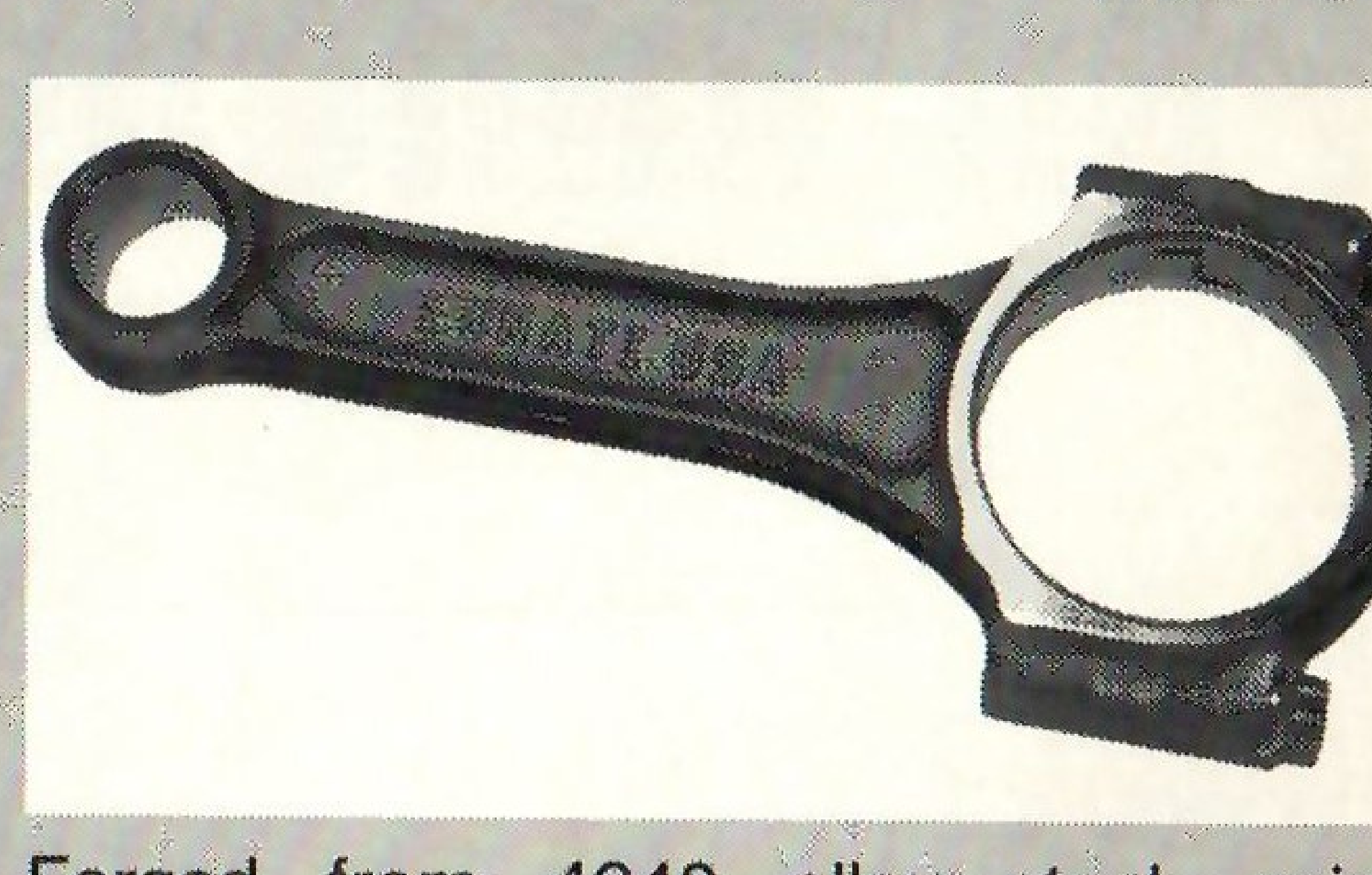


Lunati Solid Roller Lifters have been proven exceptionally effective in all types of racing applications. Fully rollerized needle bearing roller tips feature hardened shafts, pressed in and then retained with c-clips for added strength and protection. Spring loaded "pop-up" design allows for cam changes without removing the lifter from the bore. Prices for lightweight "pop-up" roller lifters start at $245.70. Vertical bar lifters are also available, as are 180° offset lifters that are required in some installations utilizing special heads or offset intake runners.



Send $15 US for Lunati's Promo Pack, consisting of catalog, T-shirt, and decals. ($18 in Canada) No credit cards or personal checks on promo pack, please.

StreetRace™ Rod



Forged from 4340 alloy steel, using 187,000 psi cap screws, Lunati now offers a replacement connecting rod for your street engine. You no longer have to rely on reconditioned rods. Lunati introduces the StreetRace™ Rod, lighter than a stock 350 rod, yet much stronger than the famous GM "pink" rod! Available with or without burnished Ampco bronze bushings in Small Block Chevy 5.700" length and with a bronze bushing in 6.000". This new rod has passed the 10 million cycle test and is capable of handling approximately 450 horsepower @ 7000 RPM. And, the StreetRace™ Rod is priced less, so you save money! The StreetRace Rod is priced at $399 for a balanced set of 8 in both 5.700" and 6.000" lengths. For more information, call the dealer nearest you, or call Lunati's Tech Advisor direct at 901-365-0950, or fax him at 901-795-9411.

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SPEED READING

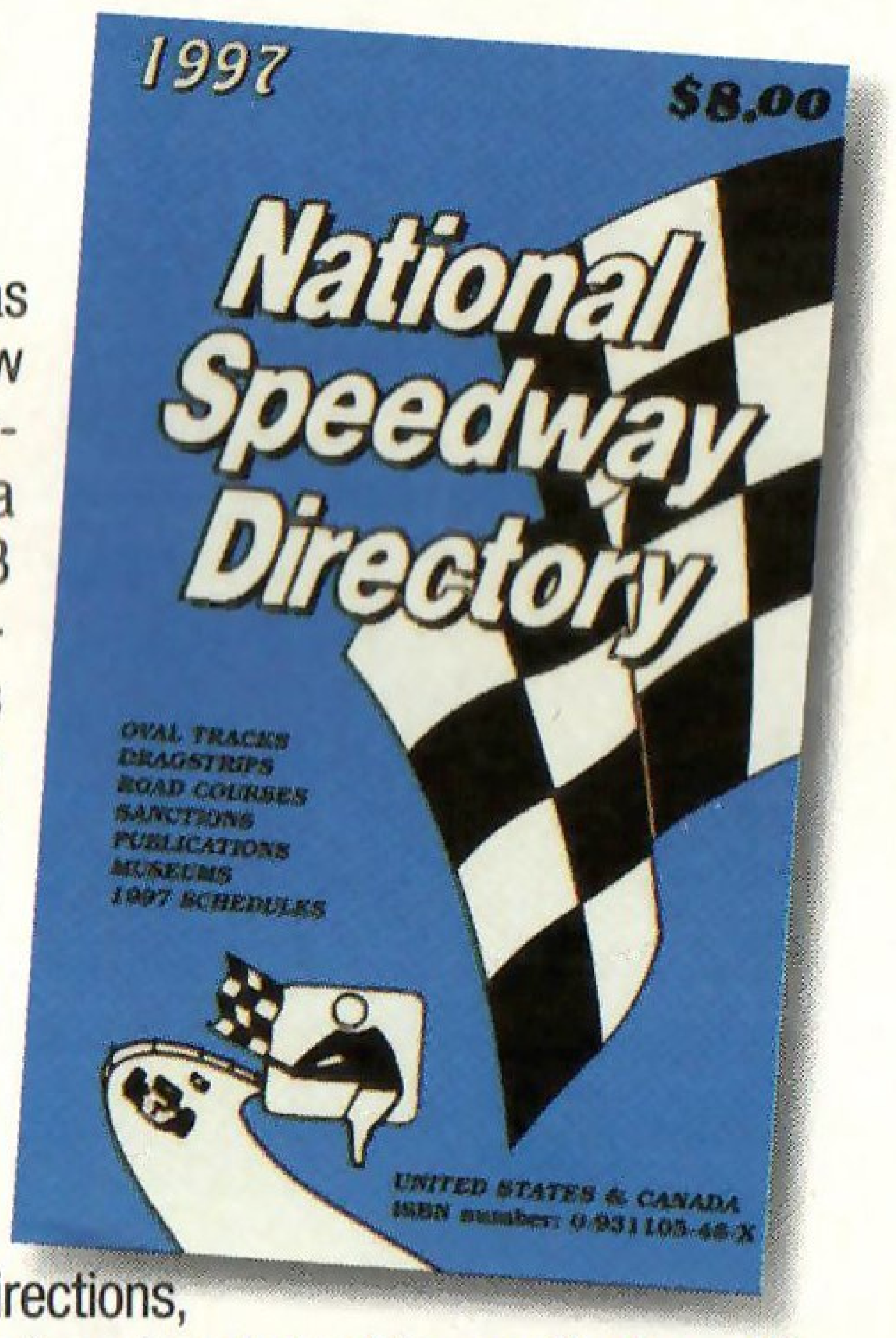
BY CAMERON EVANS

PHR Announces NMCA 200mph Club

In order to sweeten the pot for the National Muscle Car Association's Pro Street competitors, *POPULAR HOT RODDING* Magazine has established the "PHR 200 MPH Club." The first eight NMCA-legal Pro Street drivers to eclipse the speed barrier will receive a special ring and commemorative plaque to honor their accomplishment. In order to be eligible, cars must pass NMCA tech inspection and their 200mph run must be made at legal weight at an NMCA event. This further enhances *POPULAR HOT RODDING's* commitment to help promote the nation's best organization for full quarter-mile, fast doorslammer racing — the NMCA Flowmaster Fastest Street Car Shootout, Presented by *POPULAR HOT RODDING.*

Only Mike Moran and Pat Musi (left) have pushed their Pro Street machines past the mark, but both did so on testing or exhibition passes, without verification of legal weight and rules requirements. What about Tony Christian and his '57 Chevy? The big red car is thought to be aerodynamically inferior to its faster counterparts. How's that for a challenge, Tony?

Key to Avoiding Boredom



When you travel as much as we do, its good to know how to find some reliable entertainment in a strange town: like a Sprint Car race or a local Quick 8 drag show. To find the local speedways and drag strips, we've always used the National Speedway Directory. The 1997 edition is finally available, and it's okay the year is more than half finished, 'cause the addresses never change!

The detailed directory lists info on 297 drag strips, 1,072 oval tracks, and 76 road courses, including phone numbers, exact directions, approximate elevations (for you tuners), and each track's sanctioning affiliations. It's an essential tool for planning a trip where you're bound to be bored and can sneak off for a Saturday night show or maybe even a whole weekend, if no one misses you.

Each copy is only $11, or you can get two for $18. Send a check or money order to National Speedway Directory, P.O. Box 448, Dept. PHR, Comstock Park, MI 49321-0448, (616) 361-6229.

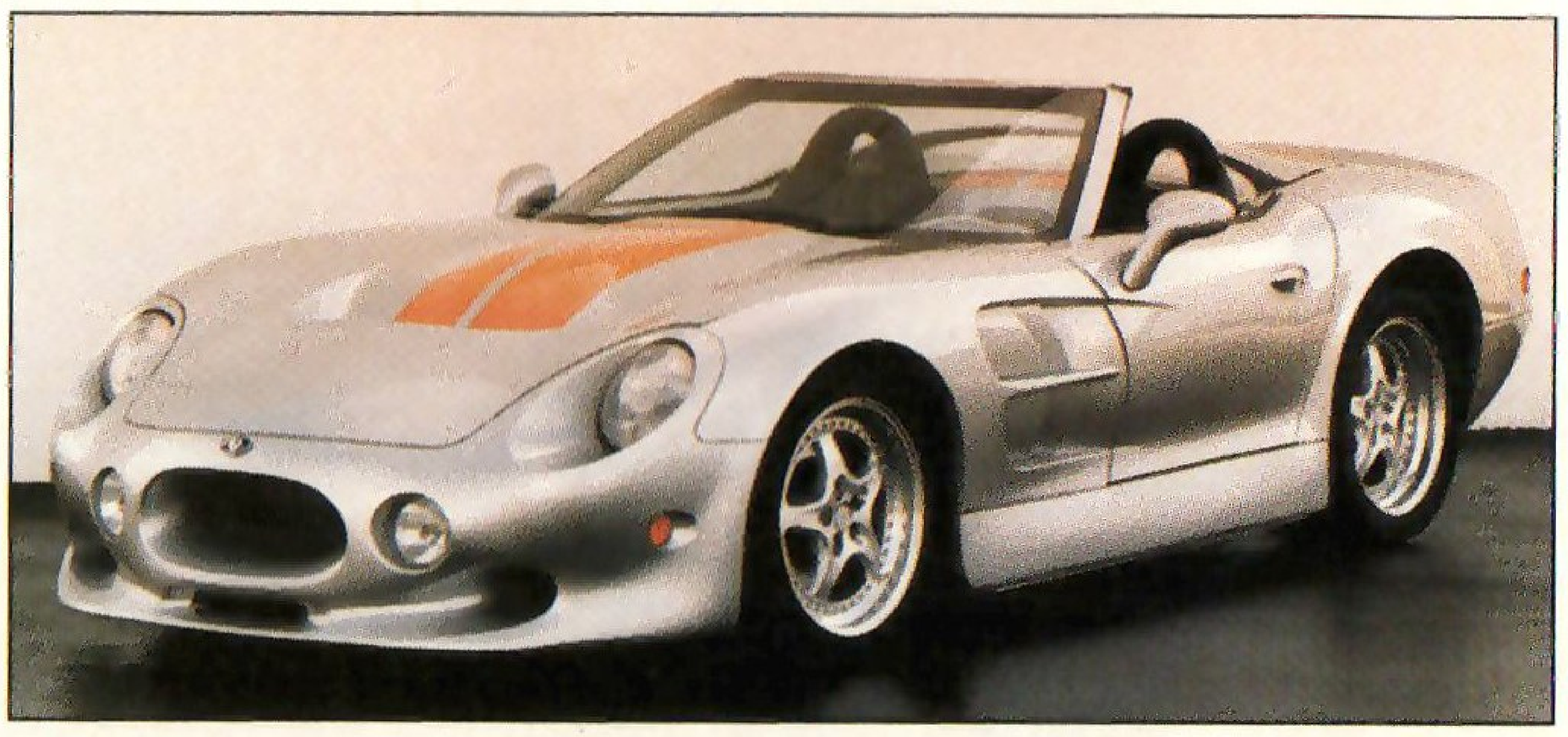
Cruzin' Rhode Island

You don't have much time to plan for it (since it might have already passed), but here's a last minute recommendation for an East Coast car show and cruise which can't be beat. It's the 4th Annual Newport Cruizin' Nationals, held at the 26-acre Glen Farm Estates in Portsmouth, Rhode Island, presented by GM Restoration Parts.

Nearly 1000 pre-'72 restorations, street rods, customs, and street machines will gather on some beautiful grounds for a festival of shine (and a few sunburns, too). Companies like GM Performance Parts and Eagle One will be on hand, plus you'll see the special collections from host clubs like Bristol County Street Rods, Bay State Street Machines, and the Drifters.

For more information, call (401) 766-8591, but we suggest just pulling out the map and making quick plans.

Shelby to Auction Public's Series 1



Though the absolute first example of Carroll Shelby's all-new Aurora-powered sports car, the Shelby Series One, will traditionally go to his new Las Vegas headquarters, Shelby announced the first publicly-available car will hit the Kruse International auction block in Auburn, Indiana, over Labor Day weekend.

Any profit collected over and above the cost of the car will go to the Carroll Shelby Children's Foundation for heart and kidney treatment, in the name of Lana Dahl Shelby, Carroll's wife who recently passed away.

Details on the Aurora's high performance modifications are yet to be disclosed, but Delphi, CTEK, Dura, and Multimatic, all world leaders in automotive engineering, have all committed to developing special fuel injection and electronics for the Aurora. From what we learned in our month at Indy, new cam grinds and a laptop for fuel mapping could hop up the stock version just fine!

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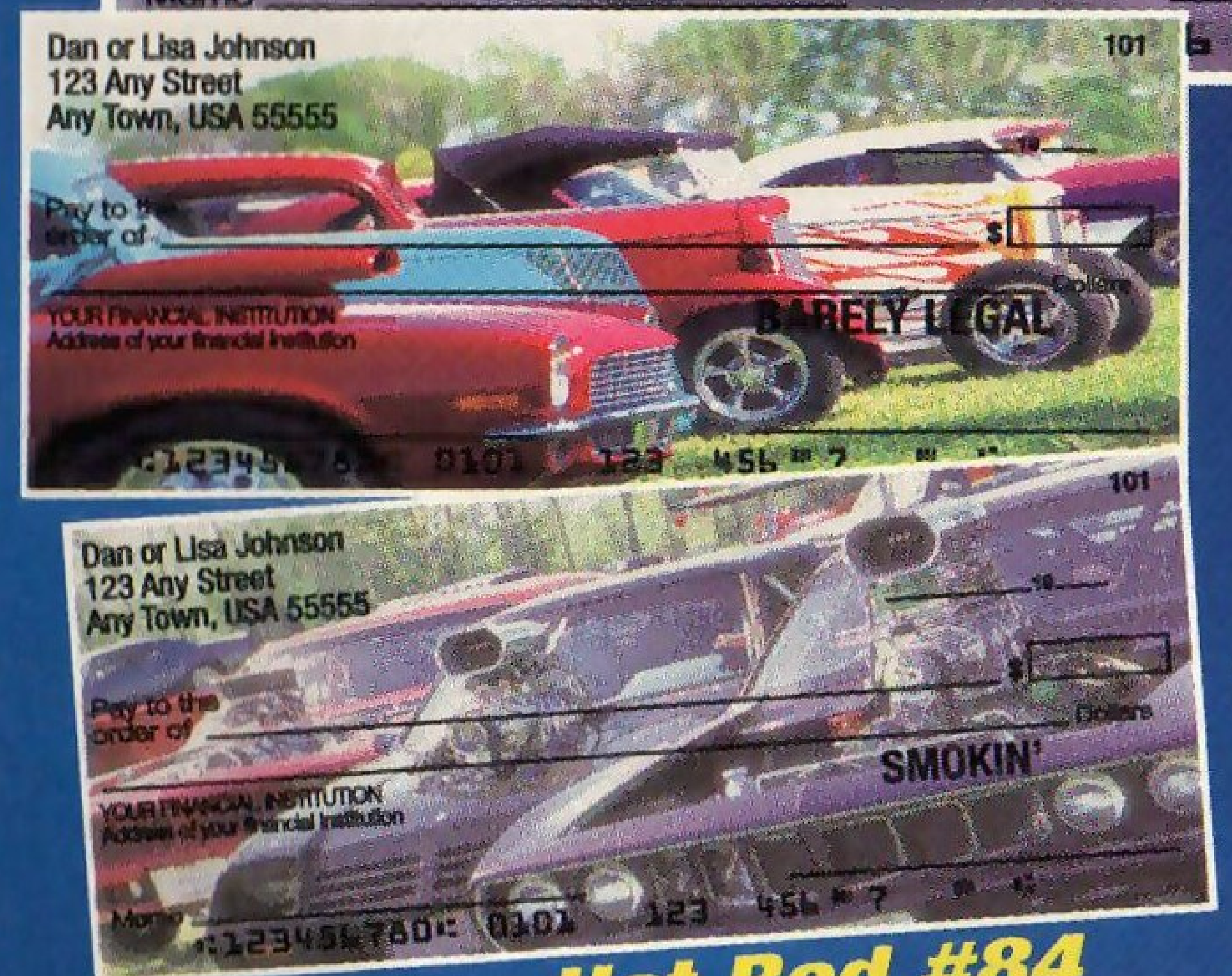
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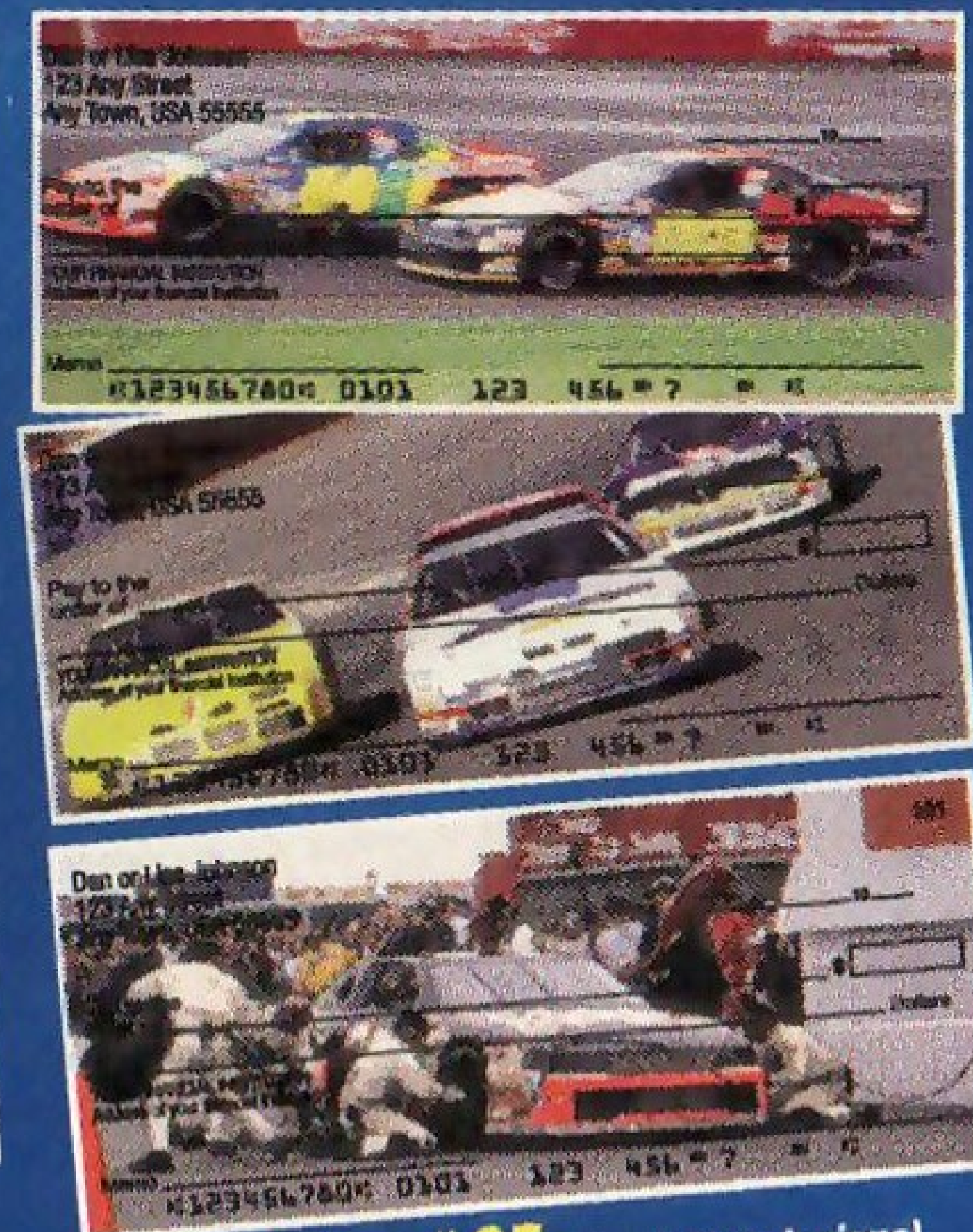
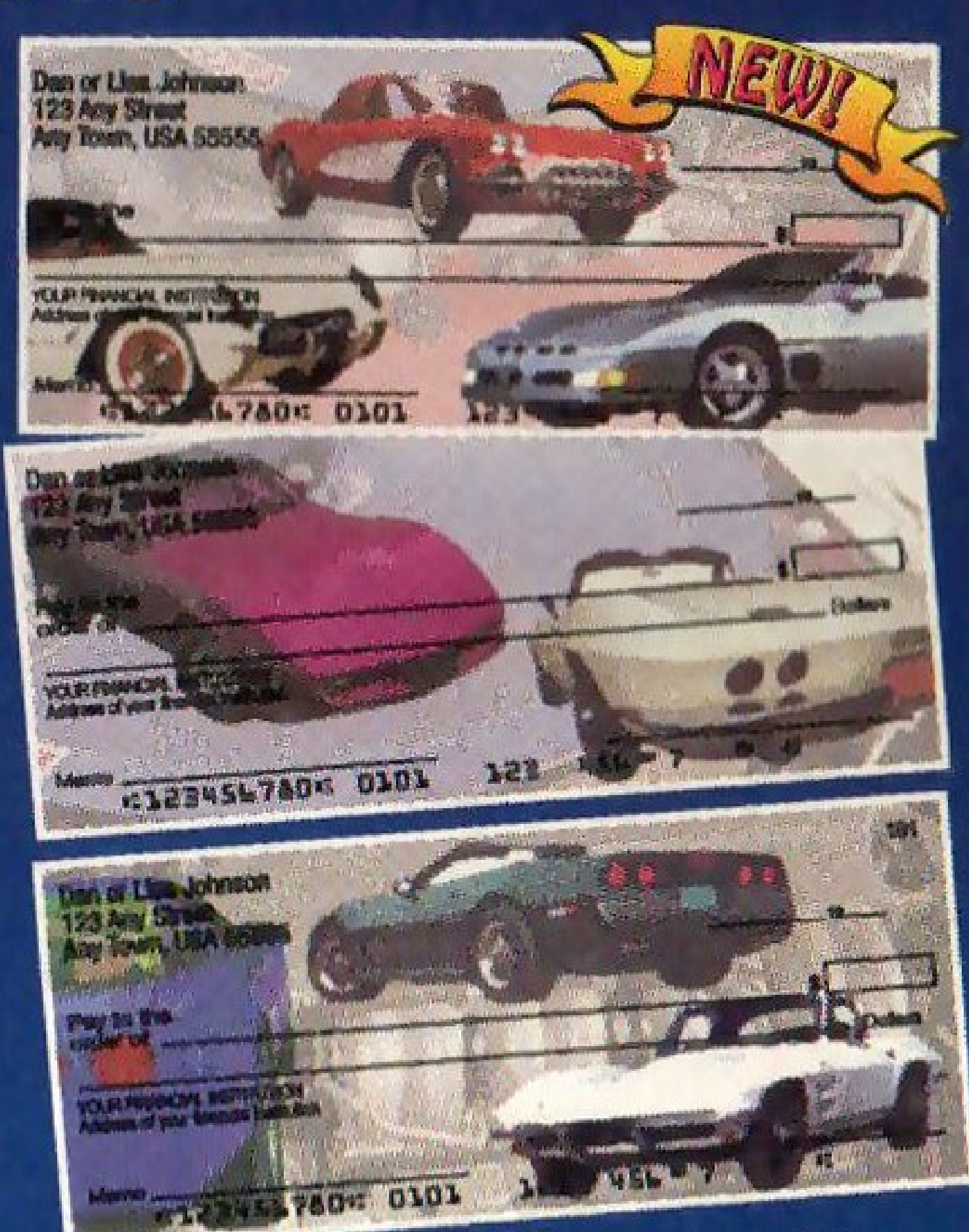


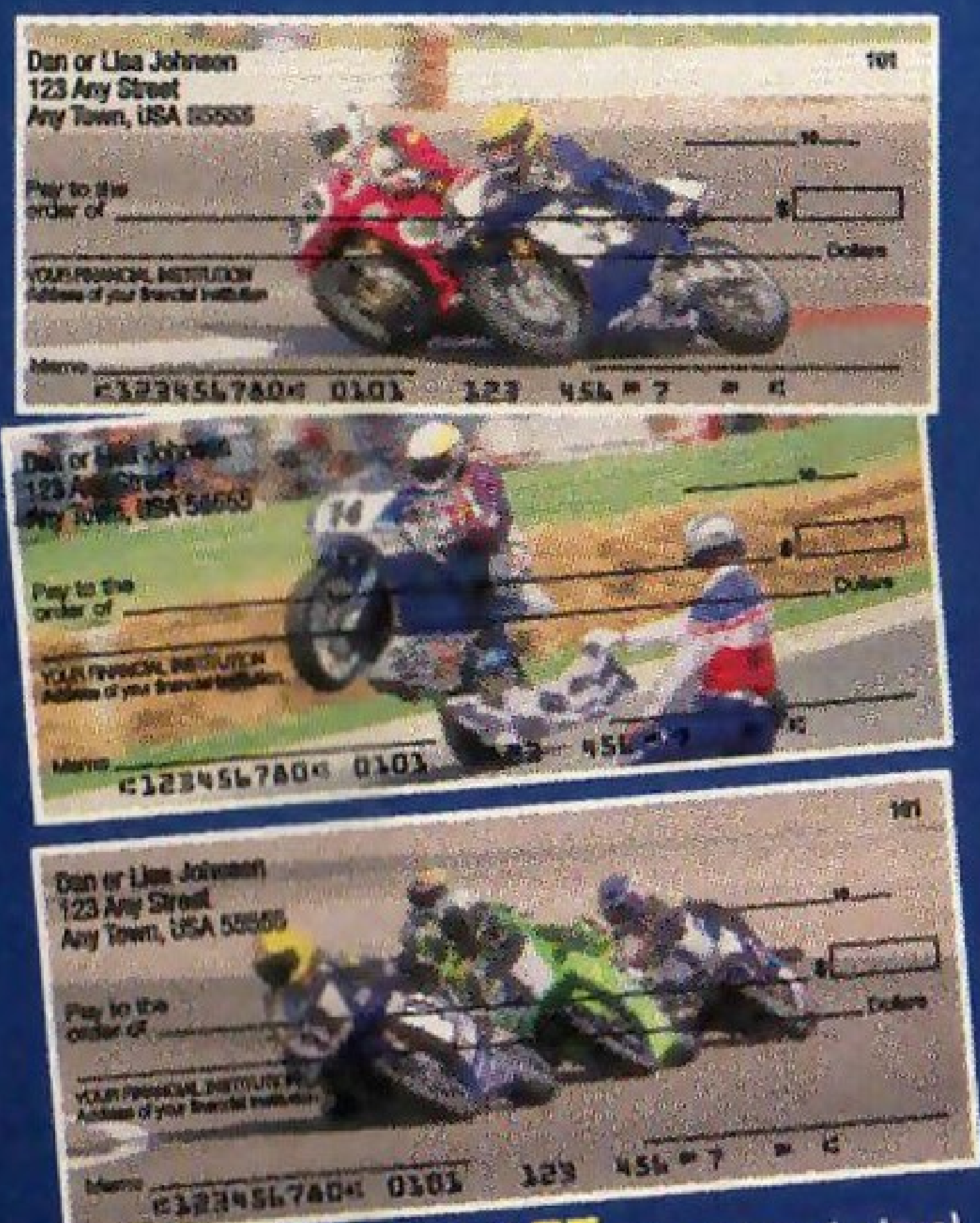
Racing #35 (3 rotating designs)

Mustangs #44 (3 rotating designs)

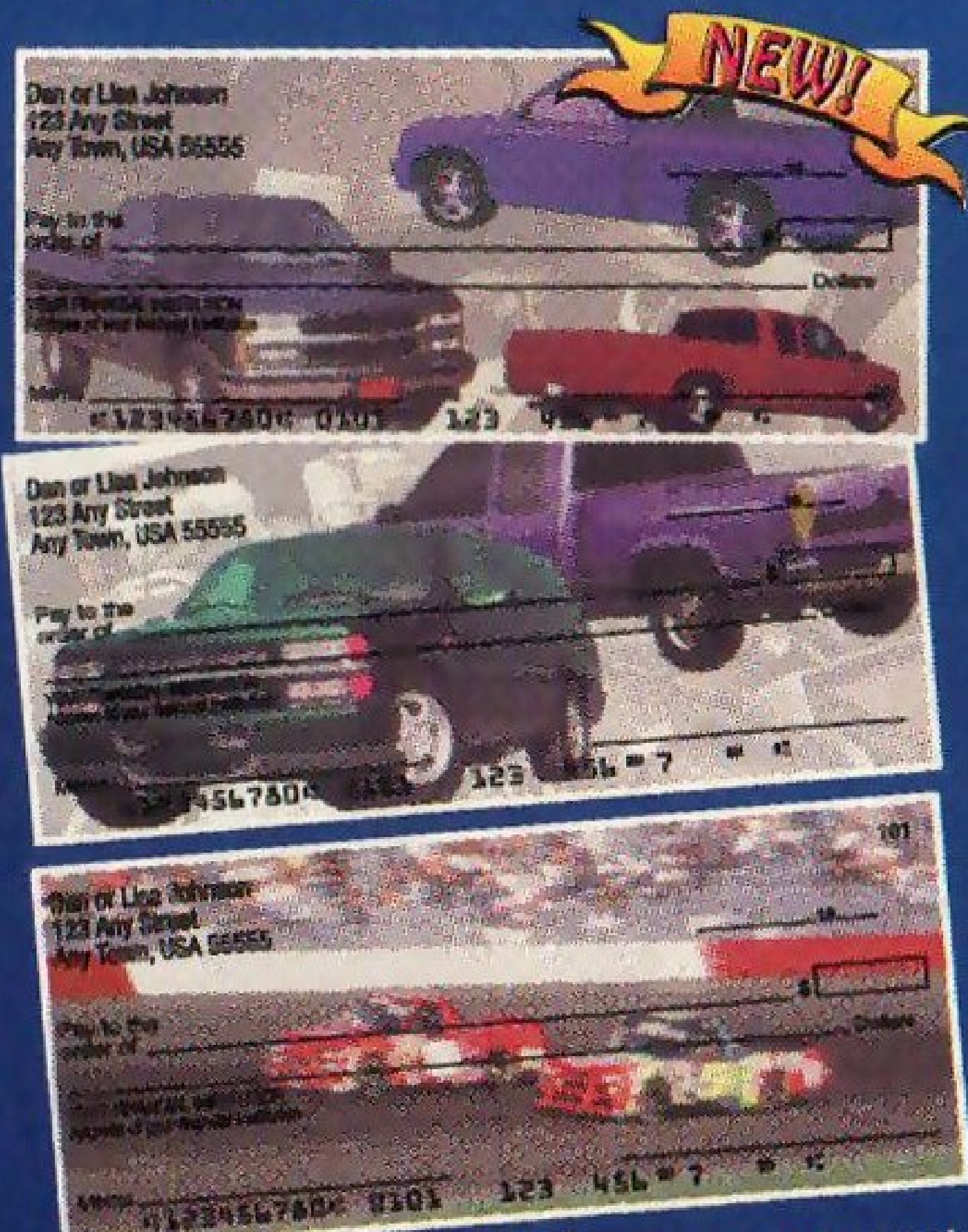
Mopar #68 (3 rotating designs)



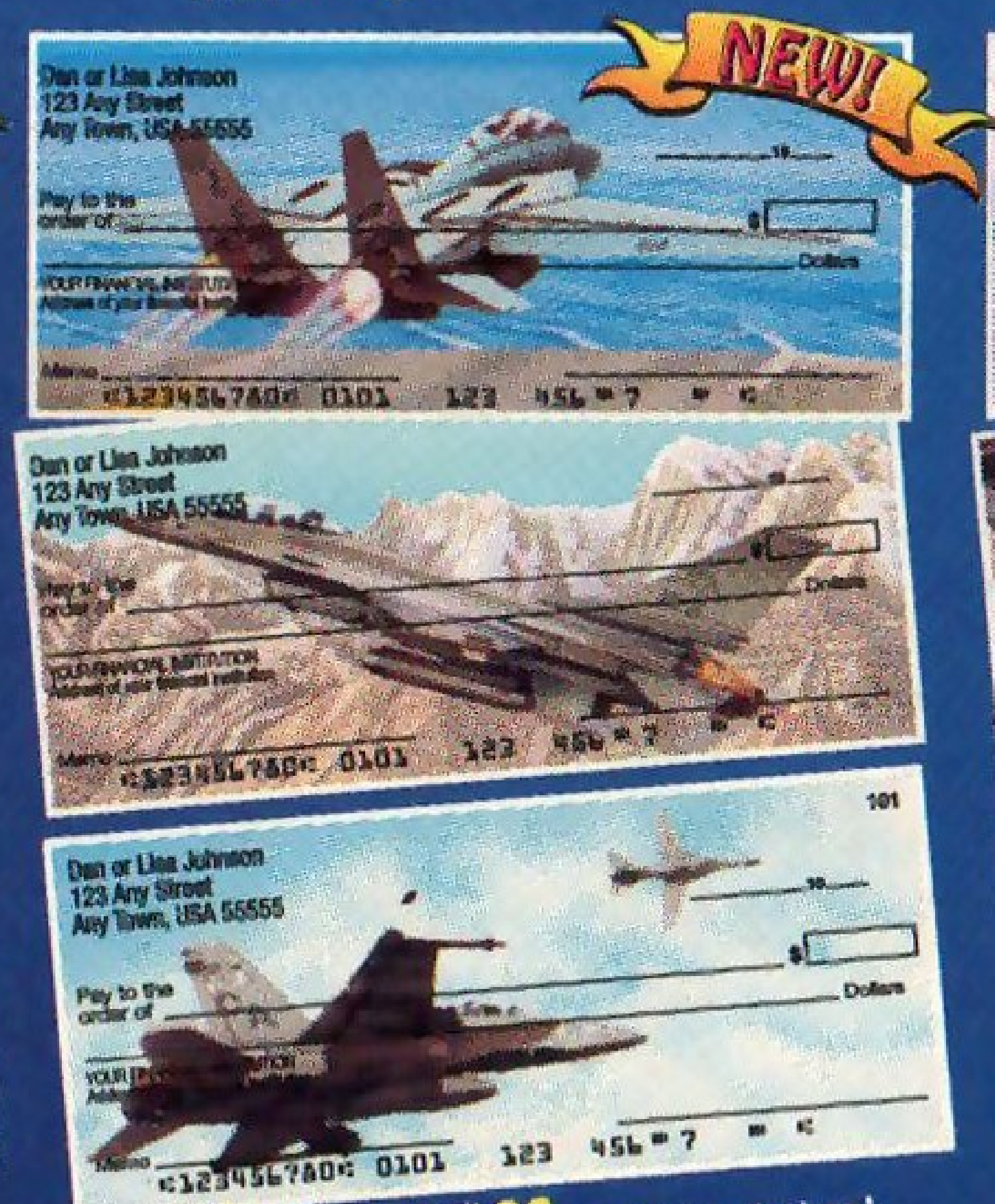
Sport Car #18 (3 rotating designs)



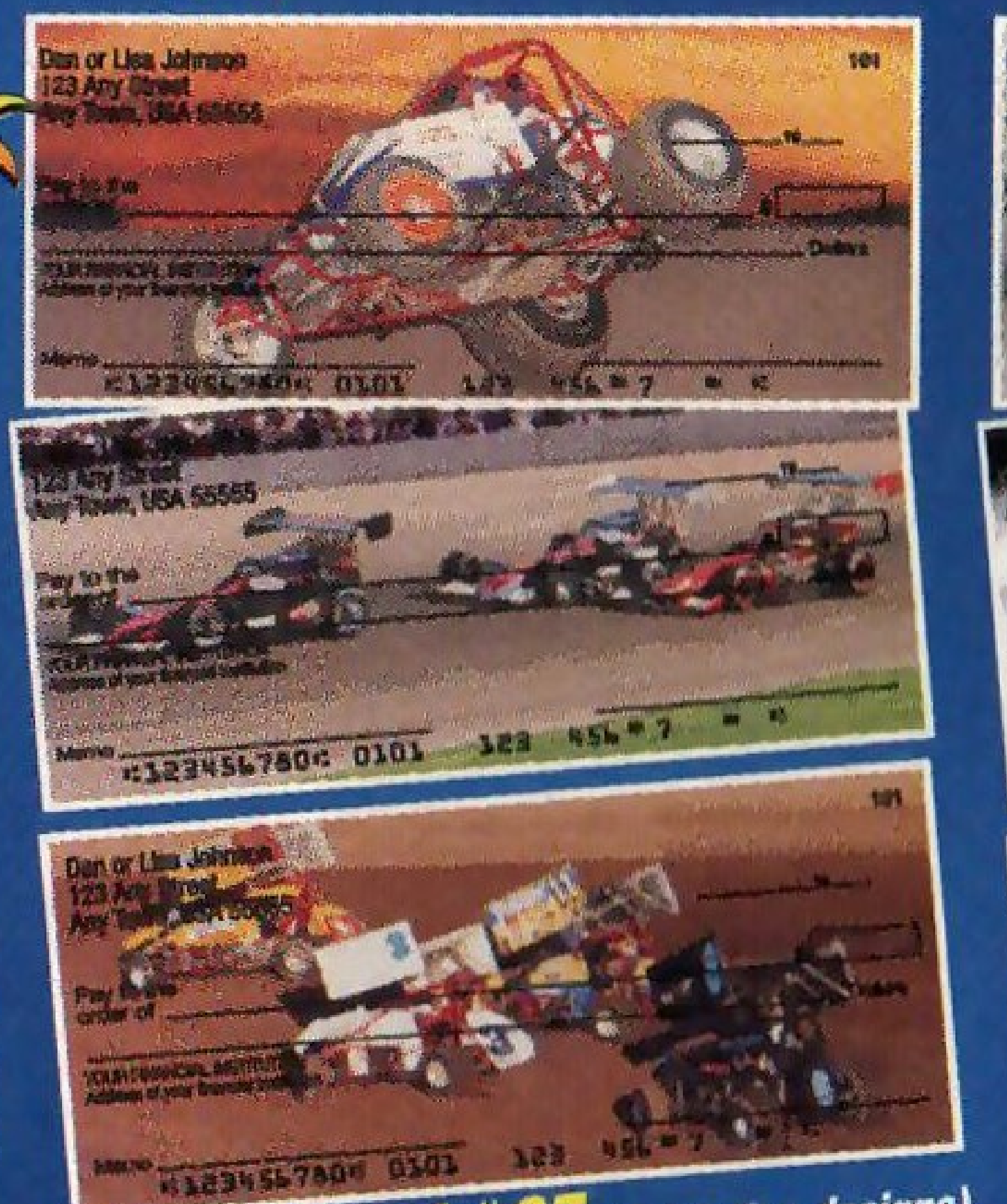
Street Bike #77 (3 rotating designs)



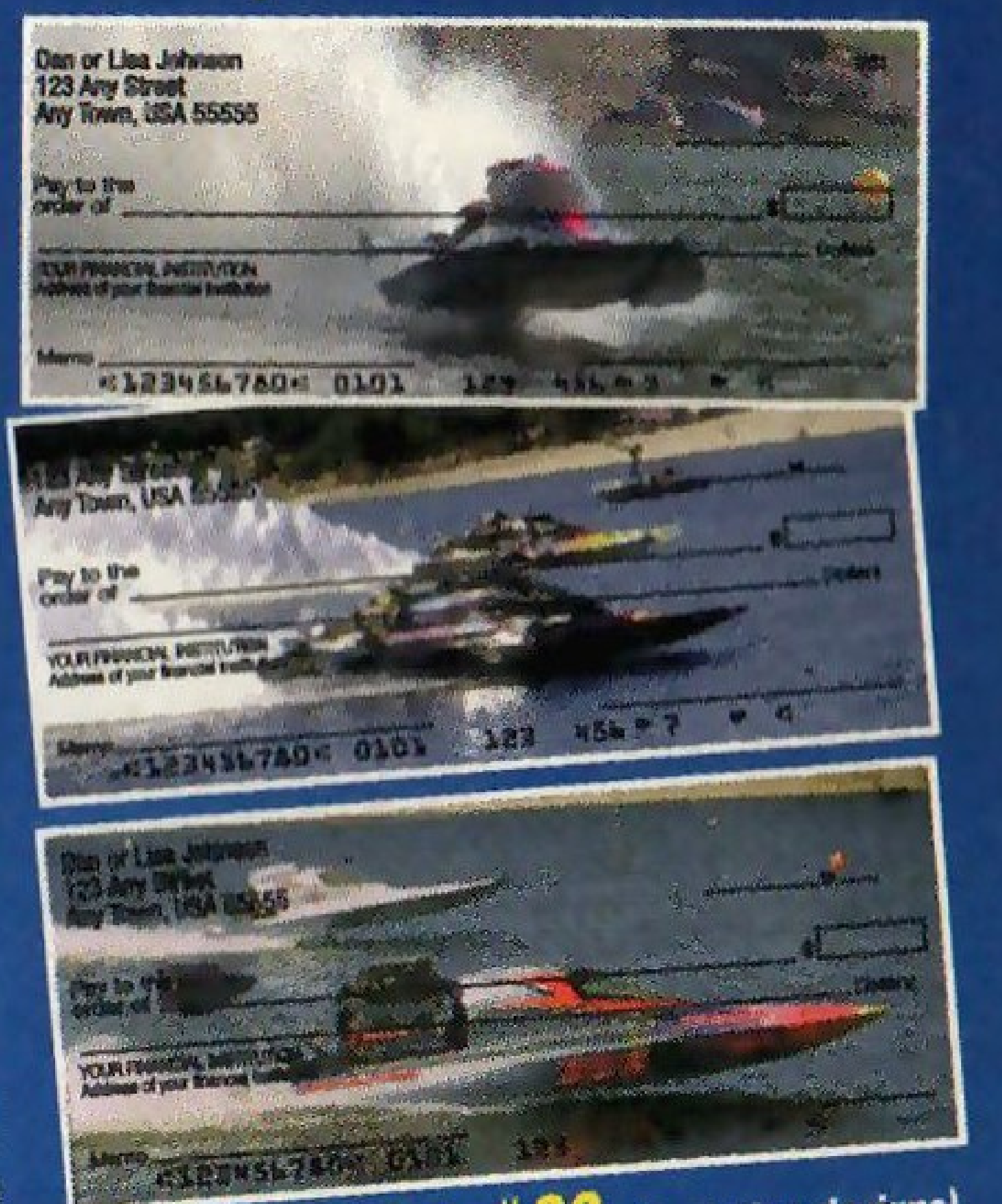
Sport Truck #85 (3 rotating designs)



Fighter Jet #92 (3 rotating designs)



Open Wheel #37 (3 rotating designs)



Boat Racing #38 (3 rotating designs)

Also available from the Styles Company... Alien Encounters #53, Angels #52, Astronomy #54, ATV #63, Baseball #69, Basketball #14, Birds of Paradise #64, Bowling #03, Cats #27, Country #09, Country Dance #72, Dental #56, Diving #51, Dolls #22, EMS #34, Environmental #10, Equestrian #78, Fantasyland #67, Fishing #23, Firefighter #32, Fitness #58, Football #75, 4x4 Wheeler #48, Golf #61, Hockey #70, Hunting #11, Indy Car #33, Inspirations #73, Joe Montana #30, Manicurist #17, Martial Arts #59, Men's Fitness #39, Mountain Bike #62, Medical #04, Music #55, MX-Dirt Bike #47, Nautical #31, Nursing #20, Pro Photography #76, Player #45, Police #06, Real Estate #81, Reptiles #29, Retro #74, Puppy Love #87, Rock Climbing #60, Salon Toons #66, Sewing #08, Snow Skiing #89, Snowmobile #91, Soccer #79, Southwest #21, Sport Fishing #88, Stylist #15, Tennis #02, Tropical Fish #26, Teacher #05, Trains #82, Truckin' #57, Undersea Fantasy #50, Victorian #07, Volleyball #80, Watercraft #49, Waterski #83, Wedding #65, Wine #71, Army #40, Navy #41, Air Force #42 & Marine #43 Checks! CALL FOR A FREE BROCHURE! 1-800-356-0353

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Now all of our exciting graphics are available in full-size peel n' stick address labels!

(Labels shown match Hot Rod #84)

Actual Size: 2-1/4" x 1-1/8" • 144 labels for $7.95
ORDER ADDITIONAL SETS & SAVE...
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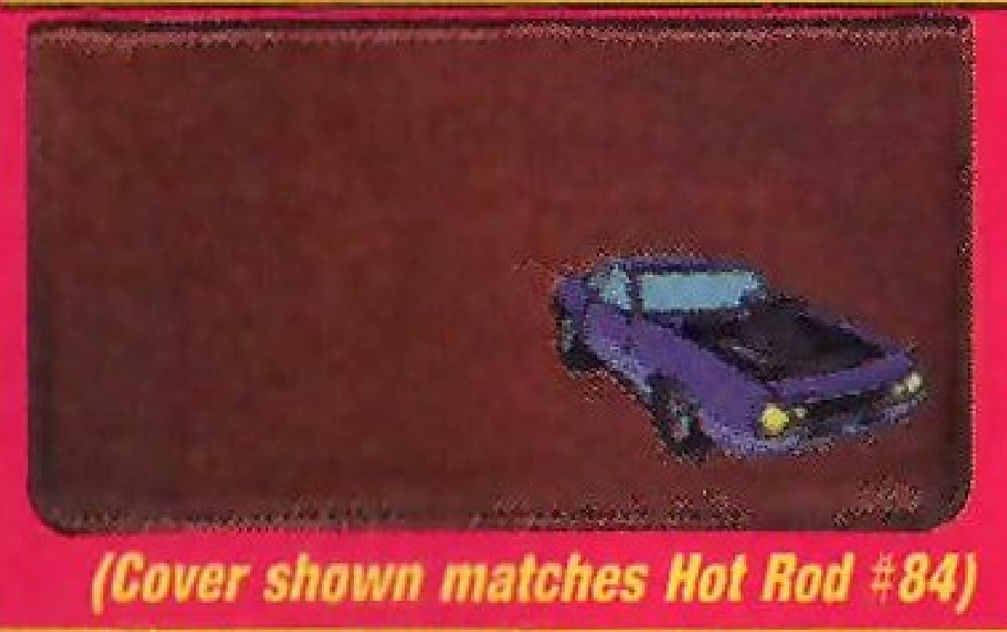
Leather Check Book Cover

Only... $18.95!



Matching custom stitched genuine leather check book covers!

Matching covers available in black and burgundy for all of our check lines!

(Cover shown matches Hot Rod #84)

It's Easy to order checks...

1. Enclose an **original VOIDED check** or reorder form from your check supply. Indicate any changes **clearly on voided check or reorder form.**
2. Enclose a **sample deposit slip** from your existing checks.
3. **Your daytime phone** (_____)________________

* Number my checks starting with # ☐
If start # is not specified your checks will start at #101

Check Pricing and Quantity

Single Checks	Carbonless Duplication
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☐400 - $25.95	☐300 - $28.95
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We also accept VISA & MasterCard.....
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Select check style # ☐☐ See pricing and ordering instructions to left and enter amount here →

Your order will be mailed to the address on your voided check. Allow 2-4 weeks for delivery	If optional typestyle is not added, checks will be printed with "standard blocktype"	(C) Old English add $2.50	
		(D) Script add $2.50	
		(E) Elegance add $2.50	
		(F) Architext add $2.50	

Optional Personal Expression Line (max of 26 characters) add $2.50
(See example of Personal Expression Line on featured checks)

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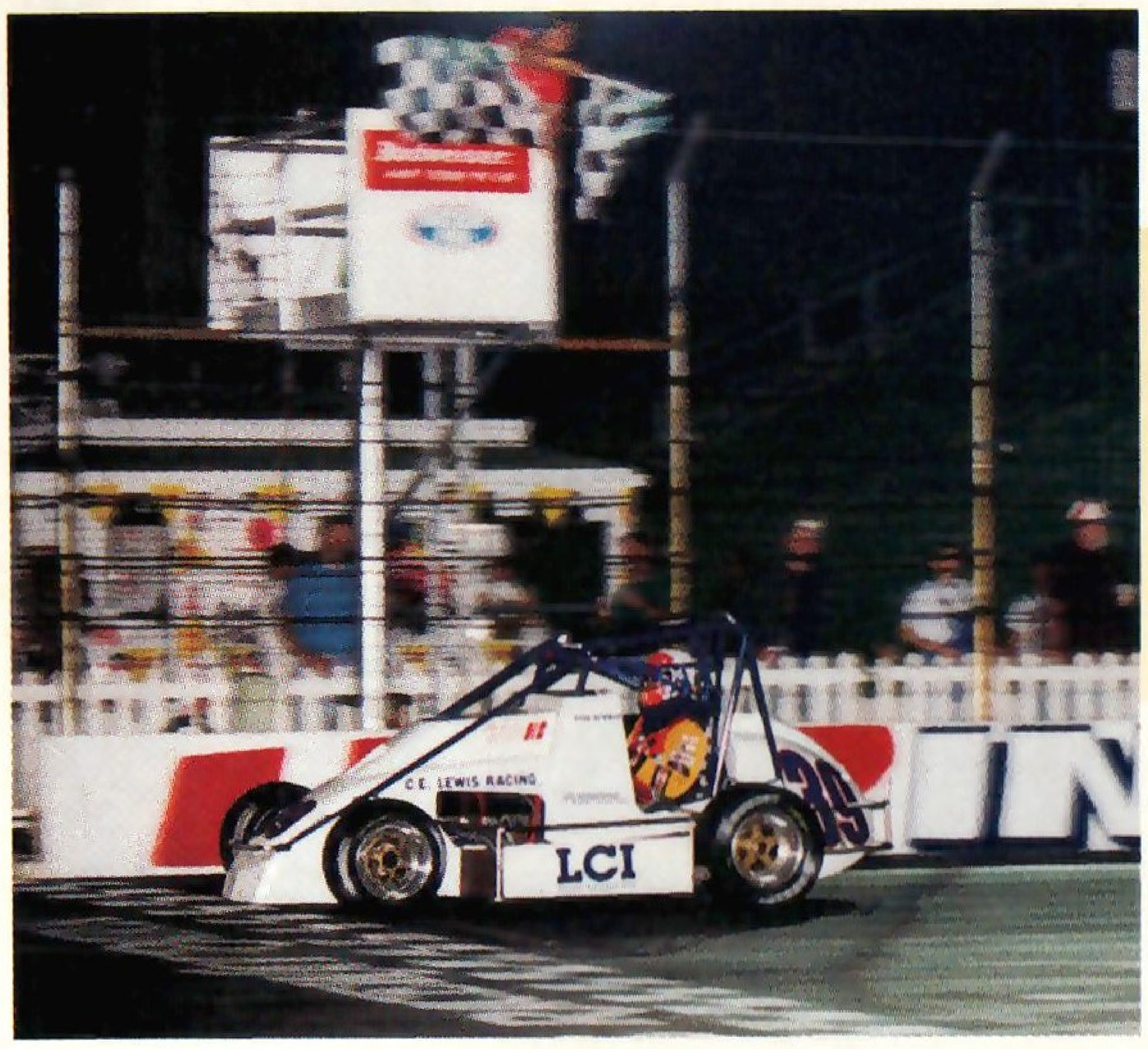


What We Did The Night Before...

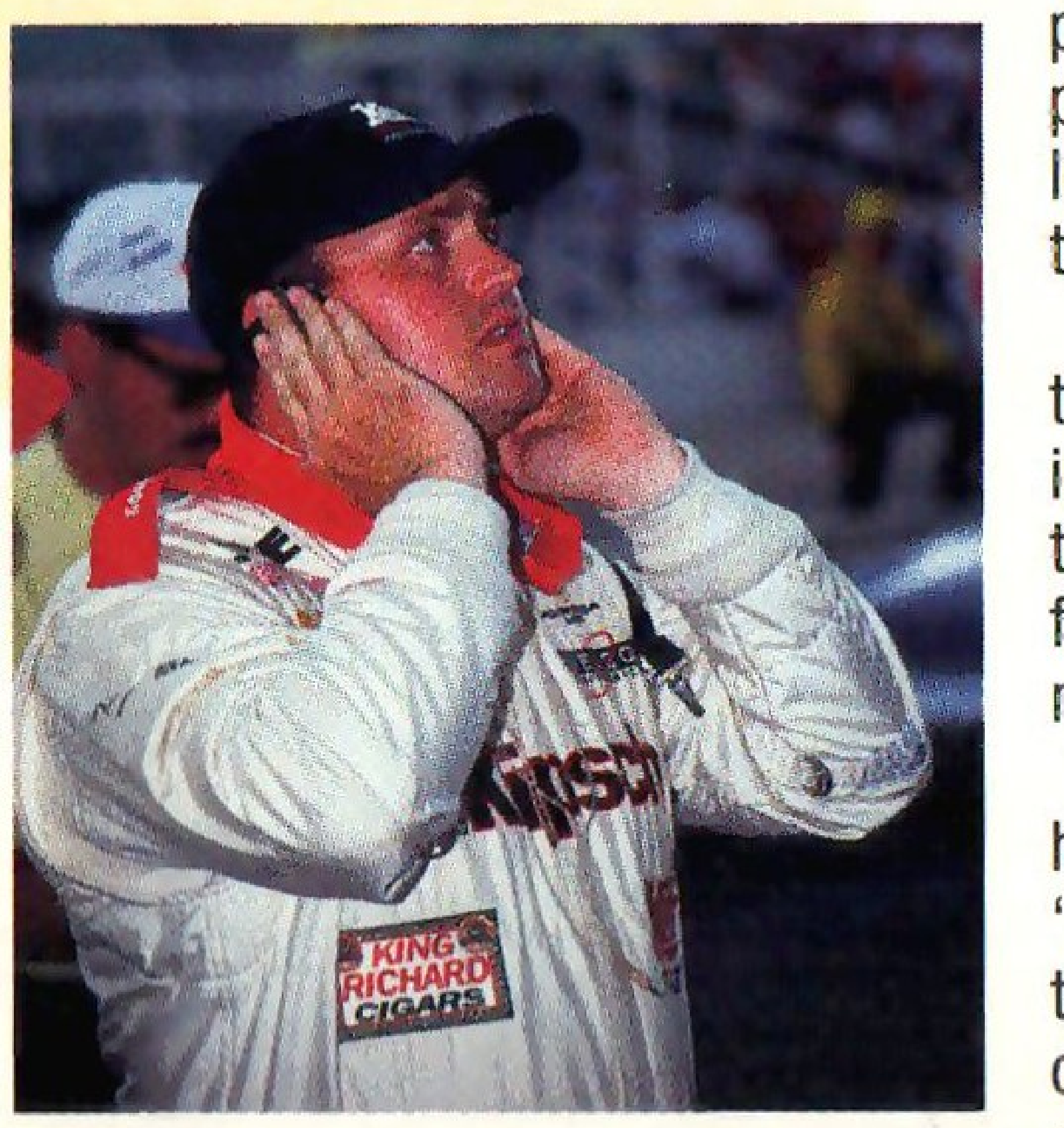
Though you can get the details on our insider trip to the Indy 500 starting on page 86, here's a piece of an Indy month you can't miss; the short track action on both the pavement and the dirt. Indianapolis Raceway Park, owned by NHRA and longtime home to the U.S. Nationals, holds the best action before the 500, with a USAC Silver Crown event held on Saturday of the final qualifying weekend, and the famed "Night Before the 500" Midget event held one week later. IRP and General Manager Mike Lewis have their act together, promoting a show that features some of the most exciting racing we've ever seen. Guys like Tony Stewart and Jeff Gordon cut their teeth in this midget show, but this time around it was Purdue student Ryan Newman and his LCI/Chuck Lewis Racing team who took the IRP glory and surely got the attention of the many Indy car owners, drivers, and crew members in attendance.

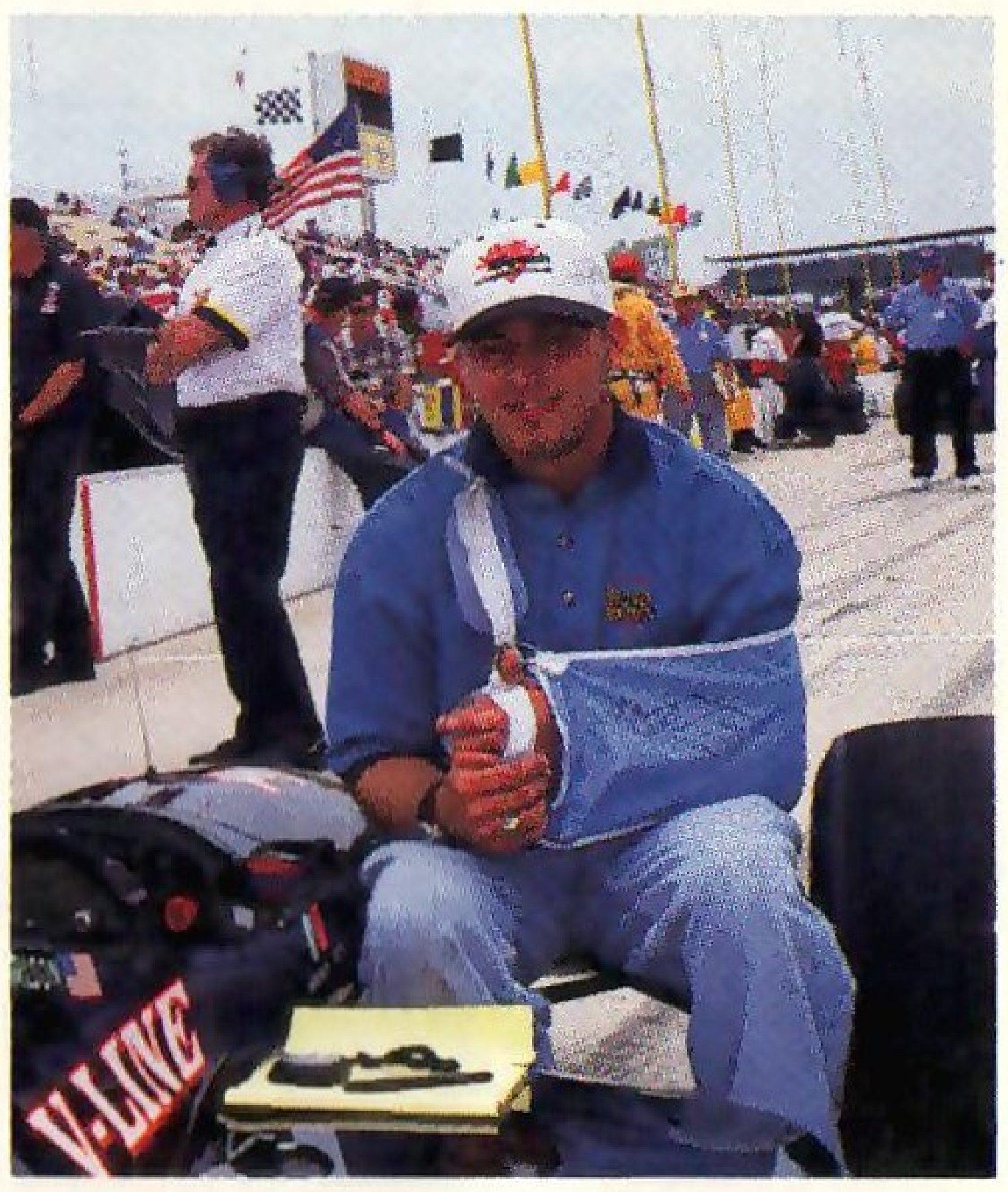
If pavement isn't your thing, try the Thursday night midget shows at the rejuvenated 16th Street Speedway, just a few miles down from the Indianapolis Motor Speedway. Built into the former Bush Stadium with four corners rounding the baselines and outfield, it's what they should do with every run-down stick and ball stadium — gut it and turn it into a racetrack!

Big on the schedule of a race fan in town for the Indy 500 also should be the Hulman 100 at the Indiana State Fairgrounds, promoted by A.J. Foyt and featuring the small-block-powered Silver Crown cars on the one-mile dirt oval. Held on the Friday before the big race, you'll sit with all the stars in town and maybe some will even strap in for a night on the dirt. Nah. The car owners haven't loosened up that much!

PDM is A-OK in the IRL

At a time when pro racing teams are concerned about security, reputation, and political position within their series, it's cool to meet racers who know how to put it all into perspective. The guys at PDM Racing are undoubtedly the most laid back bunch we've ever come across at the track, let alone at the Indy 500. Owned by former mechanics Paul Diatlovich and Chuck Buckman, the team had sponsors that were the hit of Gasoline Alley — Indy-based companies like Klipsch Speakers, Honey Brown Beer, and King Richard Cigars. With party-time backers like this and open garage doors all month (as opposed to the lock-and-key lifestyle with most teams), it's no surprise they've become a hit with their competitors.





John Paul, Jr. was set to drive for PDM in this year's 500, but his injuries from a practice crash left the seat open for midget and sprint ace Tyce Carlson (seen here checking for a downpour), who's about as funny as a driver gets. Paul was still a big hero with the team, but Tyce's sense of humor, appetite (hence his nickname, "T-Bone"), and go-for-it attitude went over big with the fun-loving sponsors and crew members. Everyone missed JP, Jr., but Tyce's great attitude went a long way with all those in the garage.

Among those stand-out crew members on the PDM staff is Jimmy Drinan, who's one heck of an Indy car "engineer" for a guy that's only 23-years-old. Jimmy already earned an Indy 500 victory ring with Buddy Lazier and the Hemelgarn team, but has taken his talents over to PDM for a better time (and colder beer, too). Though he's not a "decision maker" on the team, his bosses say he's plenty capable and we predict those tasks aren't too far away. What's with the sling in the photo? Drinan, brother to open-wheel ace, Dan, broke his collarbone while flipping his new midget at the 16th Street Speedway on Thursday before the final qualifying weekend, keeping him from his tire-changing duties on race day (Dan took over for him) but not from chasing girls on the nightly pub crawls around Indy!

What does PDM stand for? The team tells us it's for "Poor Dumb Mechanics." Now that's a team to cheer for! Who says there are no stars in the new Indy Racing League. It just so happens, we found they're a lot like us.

PHIL ABBOTT

Chevy Pro Truck Debuts In The 7.90s

They're finally here. The long-awaited NHRA Pro Trucks are beginning to surface, and they're a bit better than we expected. Well, at least the Chevrolet looks good — we haven't seen the Dodge or Ford beyond artist's renditions. The Chevy S-10 made its exhibition debut at the Pontiac Excitement Nationals in Columbus, Ohio, with both John Lingenfelter (right) and Jerry Haas (left) making laps in the 7.90 second zone at 170mph.

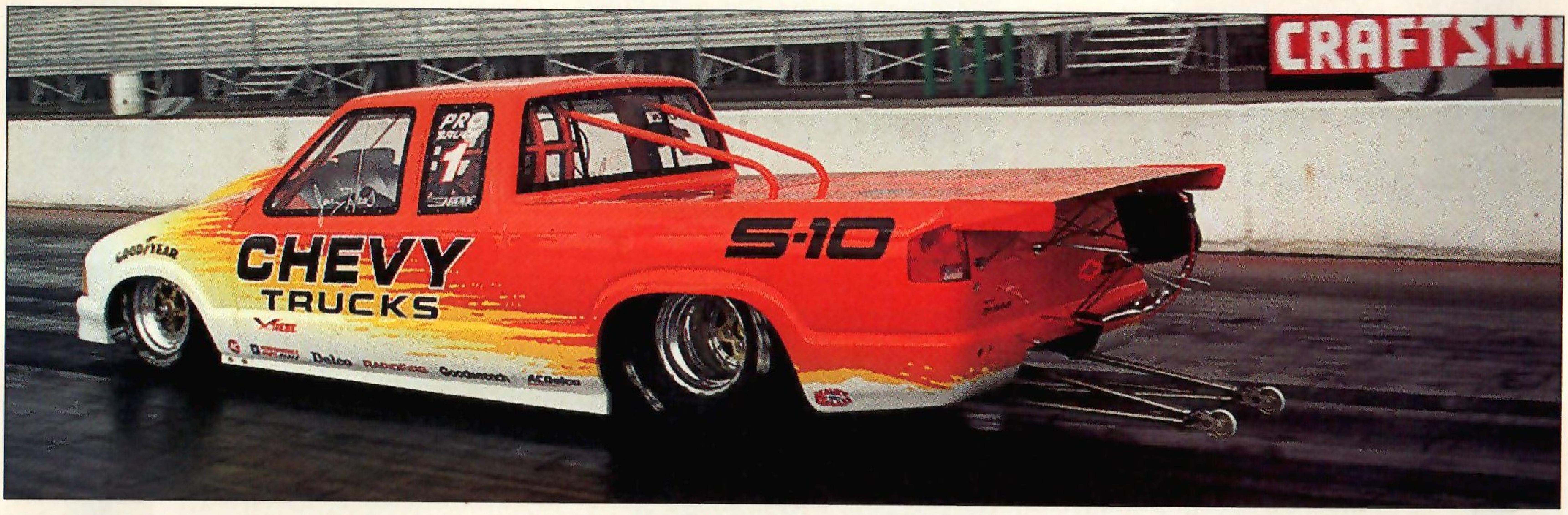
Powered by a cast-iron, Bow-Tie small block and NASCAR-style 18-degree Bow-Tie heads, the 358-inch, Lingenfelter-built engines make 850hp and are fed by two Holley Dominators on a sheet-metal CFE manifold. Power goes to the ground through a 7-inch, two-disc clutch and manually-shifted G-Force five-speed trans. While this doesn't represent the big shift from the norm we were looking for (like nitrous and/or fuel injection), the engine combo isn't like any other in the sport. What's nice about the exhibition status is that NHRA can just change the rules if they don't work as expected. If things go well, look for a true Pro class as early as next year's Winternationals.

As for the Chevy truck itself, Jerry Haas created this "extra-cab" around the best in Pro Stock technology, and went a little further in terms of styling, carbon-fiber usage, and inclusion of an Indy car-style data logger from Pi Electronics. Compared to a 2,300-pound Pontiac Pro Stocker, the Chevy Pro-Truck is 50 pounds lighter and has a justifiably longer wheelbase.

"The lower cubic-inch size of the engine and the limitations on the cylinder heads will make these trucks very affordable," said Haas. "The manual transmission will put the driver back in the driver's seat."

"We're really happy with what we learned in the wind tunnel," added Haas. "The testing Chevrolet had already done in the wind tunnel, from which the production truck was developed, made it easier for us to develop the drag-racing truck."

Hats off to Chevy for finally making a factory-backed move into the doorslammer ranks after a long break. Next up? The Dodge Boys and their Dakota, which will debut at Denver's Mopar Nationals.



IT PAYS TO BE ON TIME

With the Pro Stock wars finally settling down, Englishtown's Mopar Parts Nationals provides excellent timing for a shootout. The DuPont Automotive Finishes Pro Stock Challenge, based on qualifying positions in NHRA National Events from over the year prior, didn't include the rejuvenated Dodge Boys, but it did provide for interesting competition.

The ladder was led by none other than Warren Johnson, who had only slightly better qualifying results than Jim Yates, but WJ *snoozed* on the tree in the first round and lost to #8 qualifier, Mike Edwards. Funny we mention snoozing, as that's just what Edwards did against in the final against Jim Yates, who ran a 6.97 at 196 to take the $50,000 check. In the semi-final round of the actual Mopar Nationals, Yates lost the chance at another $50,000 for winning both events to eventually champ Darrell Alderman. How did Yates lose? He ran a quicker 6.91, but got *whacked* on the tree!

Lessons learned for Pro Stock's elite? Leave on the amber light!

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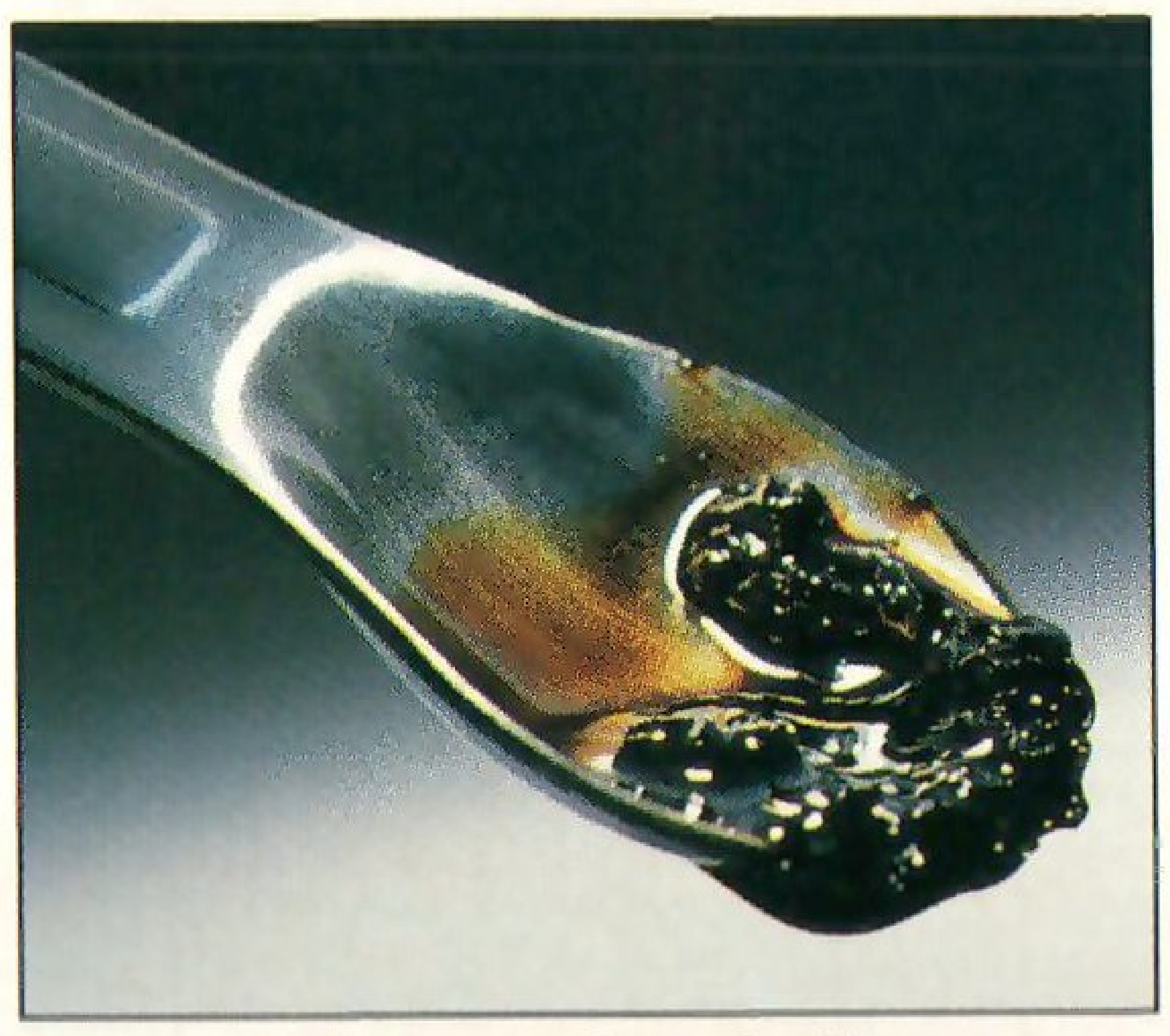
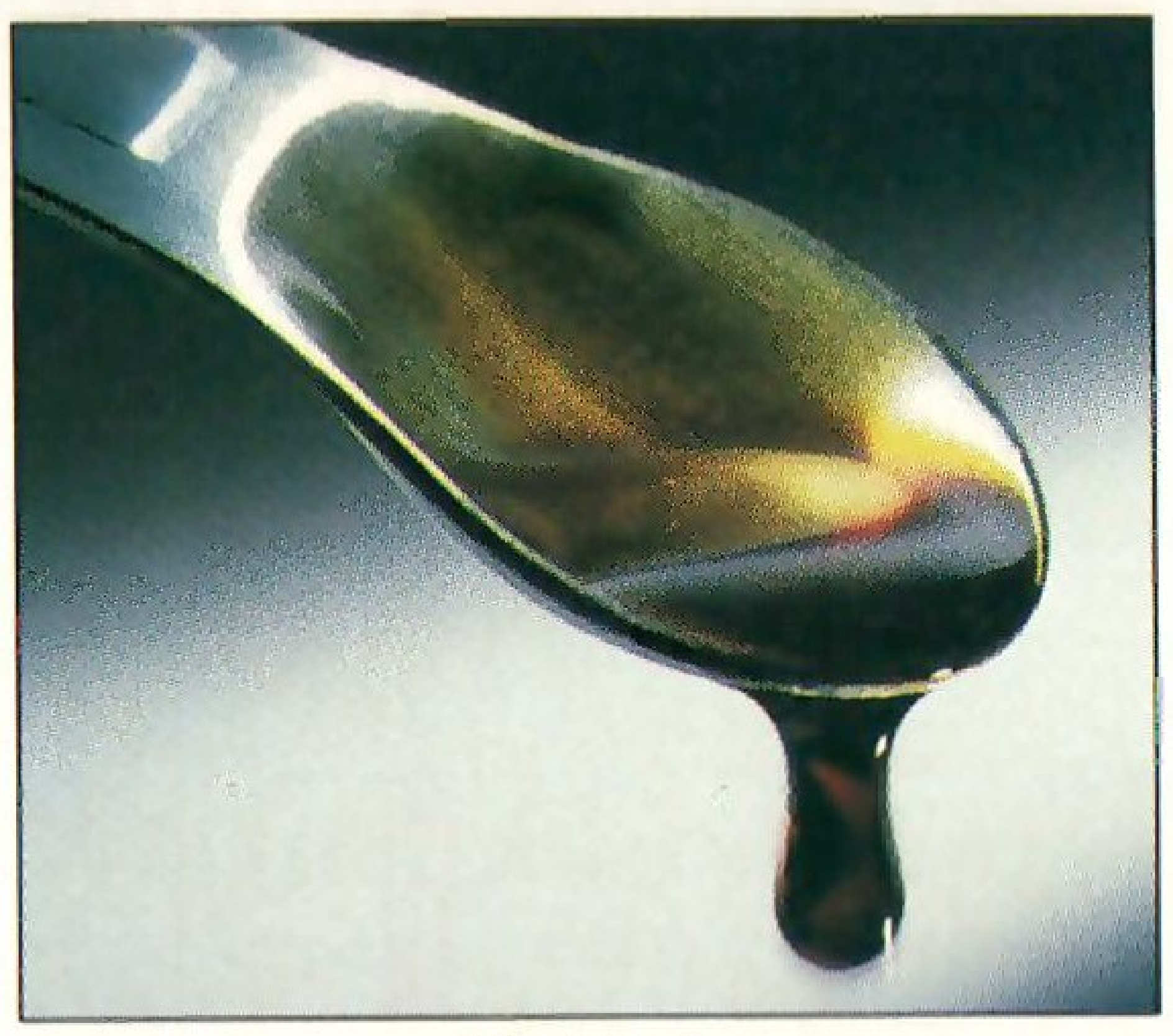


Conventional oil



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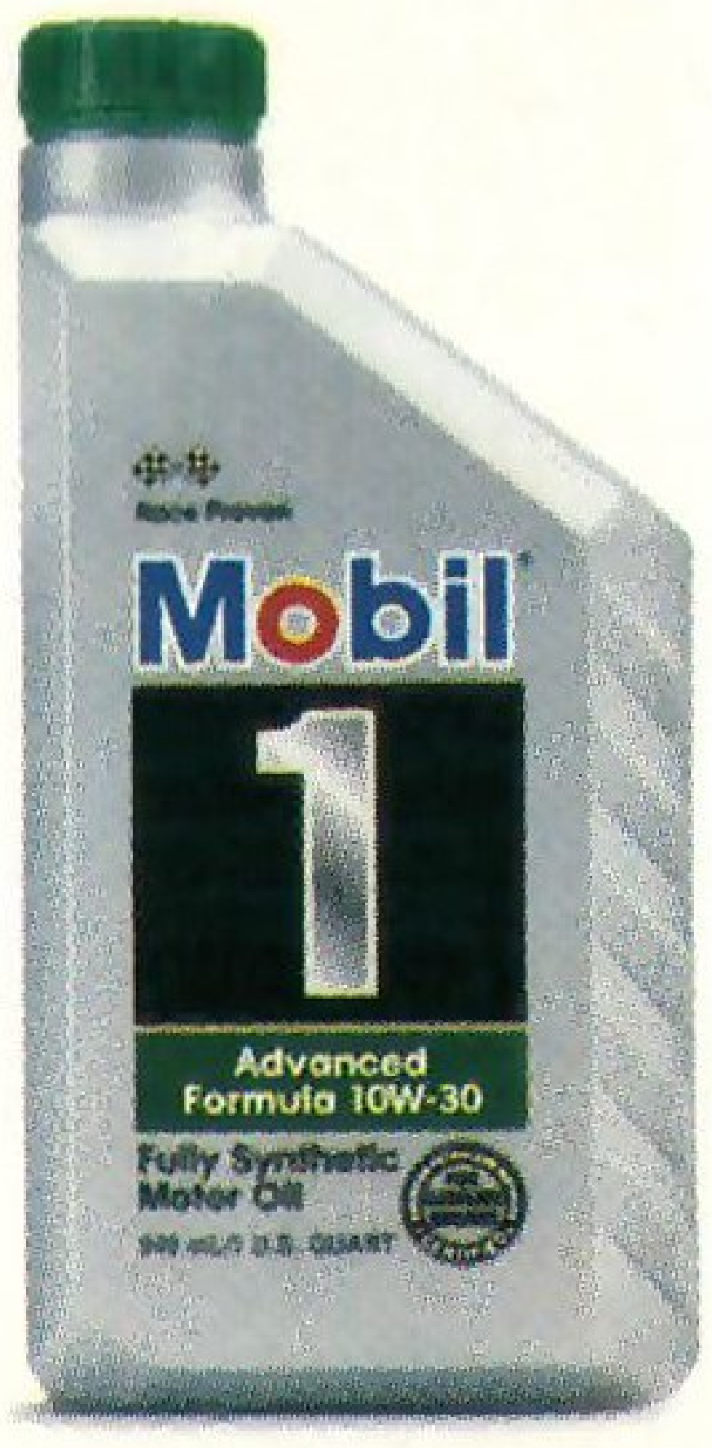


SPIN YOUR WHEELS with this Board Game

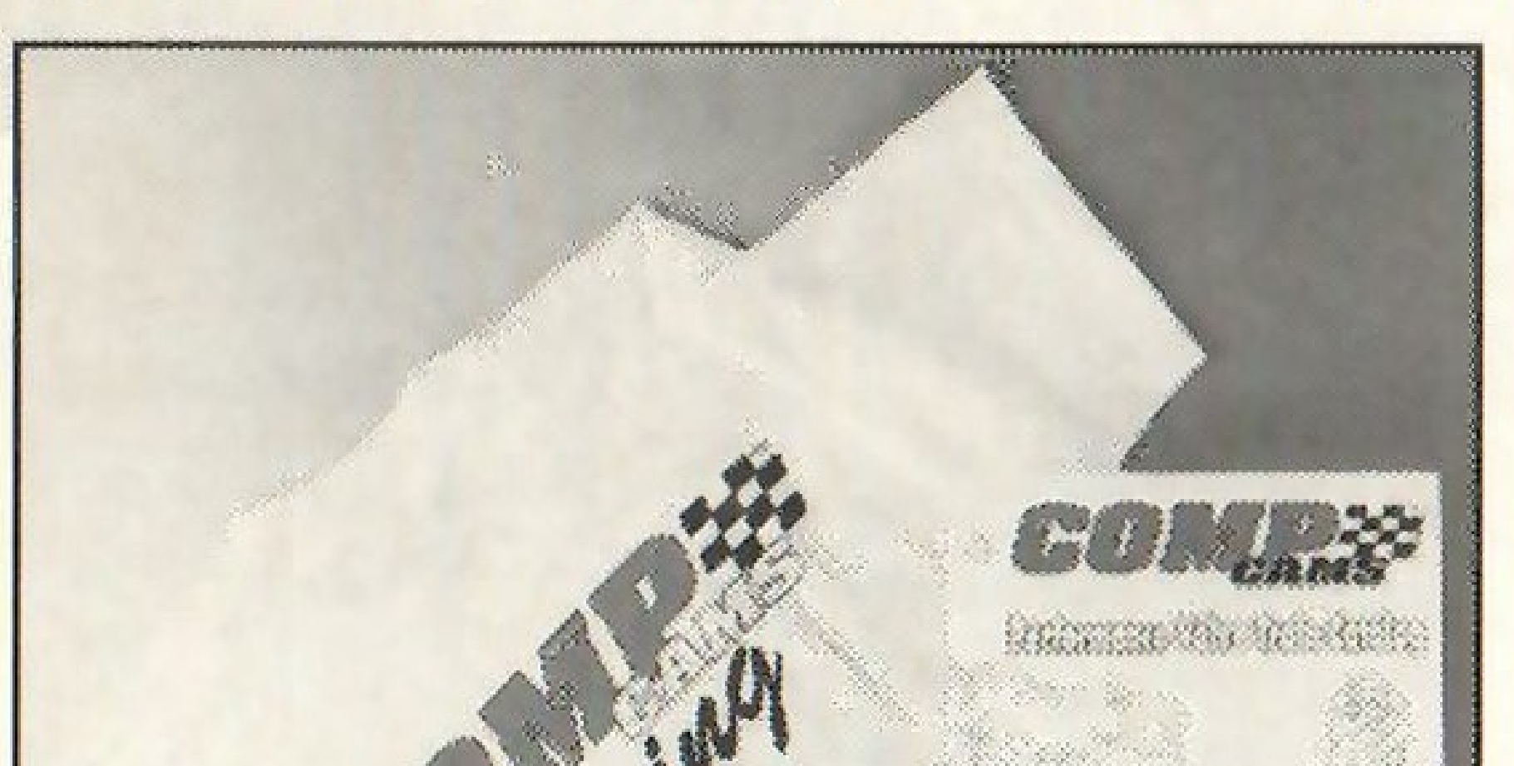
"Lose a turn and go directly to the scales for a tech check, engine pump, and magnet check for substitution of materials." That's the kind of card you might draw when playing "Burnout," a new hot rod board game we recently sampled. You can play for fun, but we've been playing for pink slips, and so far, Randy Fish got my dad's two cars, my sister's only car, and I'm about ready to put up my daily driver in a last ditch effort to take his wagon (they'll learn from keeping the registration where I can dig 'em up). Actually, Burnout's stakes aren't so high, mostly centered around big blocks, blowers, tunnel rams, and the rules of the street. It works like a typical board game, but deals with penalties and bonuses that you people could appreciate, like hard-earned performance parts.

You can get Burnout on the web (www.hotrodgame.com) or by directly contacting Holaday & Shields, 4514 Federal Blvd., Dept. PHR, San Diego, CA 92102, (800) 660-3220. Just take our advice: When you start betting with your family's cars, stop playing.

Comp Book is Here...

You catalog shoppers out there understand there's a few examples more important than others. Not to knock the little companies, but when the Comp Cams catalog is finally released, racers and enthusiasts get excited to sit down and read what's new from those diverse and techie guys down in Memphis.

The '97-98 edition doesn't disappoint, as it's got 268 pages with plenty of new stuff, including the core products like their Xtreme Energy and Nitrous HP cam series. For the first time, COMP's other product lines are in the catalog, like their new COMP Polymer Products, MAX Systems fuel and oil components, Gator Brand clamps, and an enlarged tool selection.



Here's the kicker. You'd normally have to pay five bucks just to get the catalog, but for another five, you get a T-shirt, and they'll cover the shipping. Such a deal. Call CAMHELP at (800) 999-0853 or the order line, (800) 365-9145, and they'll hook you up. Otherwise, see COMP on the web (www.compcams.com) or use the snail mail: Competition Cams, Inc. 3406 Democrat Rd., Dept. PHR, Memphis, TN 38118.

Bickel's Skills from a Book

Roy Hill has been running a successful drag racing chassis setup school for quite some time now (UAW members can even cash in on their schooling credits with a Hill class), but you've got to personally attend a Hill class to get your diploma. Pro Stock chassis builder Jerry Bickel has taken the chassis course one giant step further: home schooling!

Bickel's Racetech Race Chassis School, developed with the help of award-winning educator Robert Colesworthy, is a comprehensive, five-part program to help you learn the fabrication techniques used by the pros (and avoid costly mistakes). Using books and video tapes, the Racetech course takes you through a background introduction, related math, tools and equipment, actual fabrication, plus a final semester of body and interior construction.

You'll learn everything necessary to turn out your own car, but we can't say it's gonna be as nice as Jim Yates' Bickel Pontiac. But, who knows? To learn more, check out a sample page from the books on the web at www.jerrybickel.com or contact: Racetech, c/o Jerry Bickel Race Cars, 647 East Hwy. U, Dept. PHR, Troy, MO 63379, (314) 528-8789.

New Smog Rules Climb First Hill

Things are looking up for California's rodding community, as the state's Transportation Committee overwhelmingly approved S.B. 772, a bill introduced by Senator Maurice Johannessen which seeks to ease the burdens on aftermarket-equipped cars under the state's emission inspection program. The legislation, which passes the committee by a 9-0 margin, must now be approved by the Senate Appropriations Committee and, if passed, will be scheduled for a vote by the full Senate.

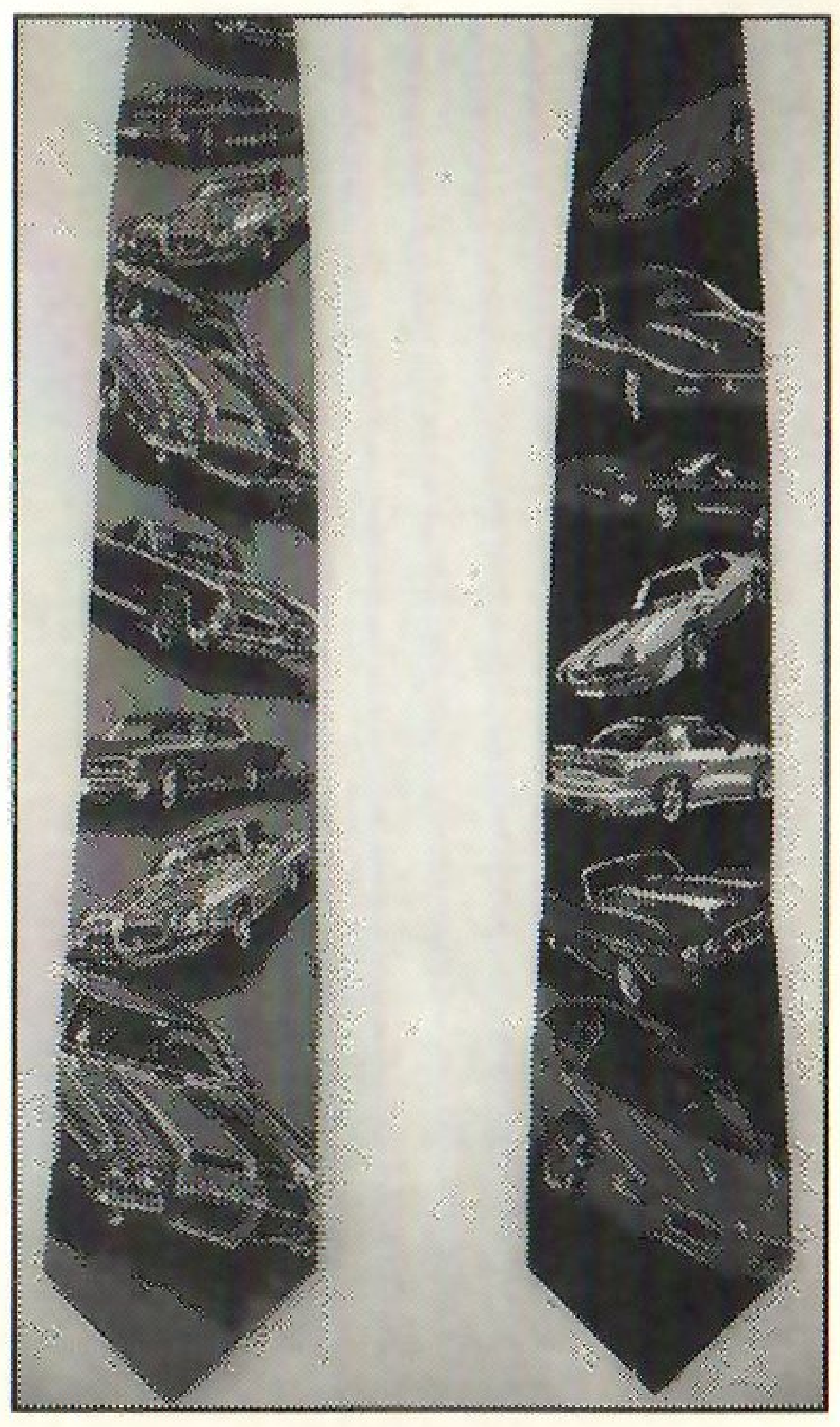
In layman's terms, you could pull up to the smog check with all of your killer parts on board, run the test, and if you're engine runs cleanly enough, you pass! There would still be some visual inspection for original smog equipment, but it's much better than the current situation involving referees upset over any and all modifications which don't meet their strict requirements.

Senator Johannessen has also been working on legislation to remove the ridiculous "smog impact fee" now in effect. Existing law imposes a $300 fee on a '75 and newer vehicle which was last registered outside California (without the important 50-state smog sticker). This legislation, S.B. 40, went through the same first step as S.B 772 with a 7-1 vote and is now awaiting the same Senate Appropriations Committee approval to move on.

TIN INDIAN TIES

The apparel market has come pretty far since the Pontiac GTOs and Trans Ams first hit dealerships, witnessed by these ties from Indian Artifacts. Company owner David Barsky calls his line of products, "The Ultimate in Pontiac Jewelry" and runs his operation from Brooklyn, so we wonder if the Ramones would have been "cruzin' around in my GTO" at Rock 'n Roll High School with their Indian Artifacts. The ties wouldn't have matched the leather jackets, and we've never seen Joey Ramone in anything even close to a tie, but it could happen.

To get yours, contact: Indian Artifacts, P.O. Box 350288, Dept. PHR, Brooklyn, NY 11235, (718) 332-4479.



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7182P S.B. Chevy, polished	$1979.00
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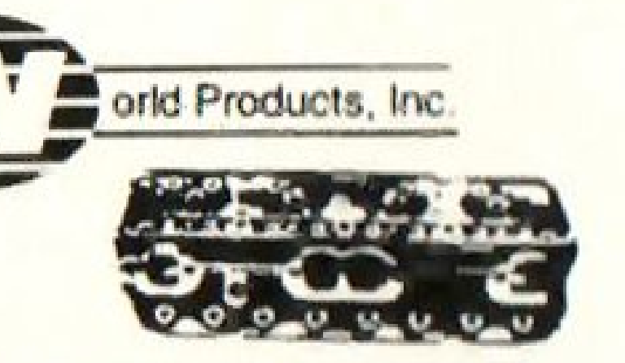
World Products, Inc.



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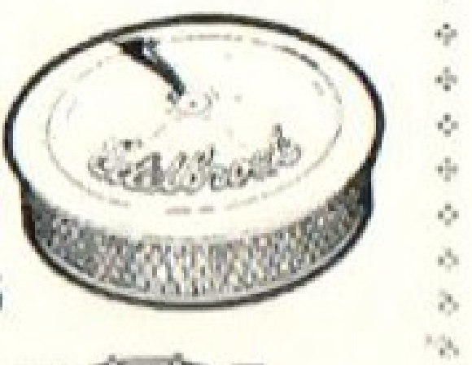
S.B. Chevy 2925........$179.95

Edelbrock VICTOR WATER PUMPS

8810 S.B. Chevy (Short)	$134.95
8811 S.B. Chevy (Long)	$129.95
8815 ('84-'92 Corvette)	$134.95
8881 S.B. Chevy (Serpentine)	$134.95
8850 B.B. Chevy (Short)	$139.95
8851 B.B. Chevy (Long)	$144.95

Edelbrock



14" CHROME AIR CLEANER $23.95

Edelbrock

PERFORMER CARBURETORS

specially designed and calibrated for Performer & Performer RPM Applications.

500 cfm man.choke #1404	$199.95
600 cfm man.choke #1405	$199.95
600 cfm elect.choke #1406	$222.95
600 cfm EGR elect.choke #1400	$233.95
750 cfm man.choke #1407	$204.95
750 cfm electric choke #1411	$229.95

Edelbrock

Aluminum Cylinder Heads

6071 RPM 70cc S.B. Chevy, angle plug, complete	$895.00
6073 RPM 70cc S.B. Chevy, ST plug complete	$895.00
6075 Performer 70cc S.B. Chevy, 50 state legal, complete	$895.00
6089RPM 64cc S.B.Chevy, ST plug complete	$895.00
6085 Performer 60cc S.B. Chevy 87-95 C.B. valve cover complete	$995.00
6045 RPM Heads B.B. Chevy (O Port) complete	$1550.00
6055 RPM Heads B.B. Chevy (Sq. Port) complete	$1550.00

ALSO FREE SHIPPING!

COMPETITION CAMS HIGH ENERGY CAMS

Increased Low-End & Mid-Range Power!

MAKE & PART #	DUR. IN.	DUR. EX.	DUR.@.050 IN.	DUR.@.050 EX.	LIFT IN.	LIFT EX.	PRICE
CHEVY V8: 265, 283, 302, 307, 327, 350, 400							
12-205-2	252	252	206	206	431	431	$80.95
12-206-2	260	260	212	212	446	446	$80.95
12-210-2	268	268	218	218	460	460	$80.95
CHEVY V8: 396, 402, 427, 454							
11-202-3	252	252	206	206	465	465	$87.95
11-203-3	260	260	212	212	481	481	$87.95
11-205-3	268	268	218	218	491	491	$87.95

COMPETITION CAMS MAGNUM CAMSHAFTS

MAKE & PART #	DUR. IN.	DUR. EX.	DUR.@.050 IN.	DUR.@.050 EX.	LIFT IN.	LIFT EX.	PRICE
CHEVY V8: 265, 283, 302, 307, 327, 350, 400							
12-211-2	270	270	224	224	470	470	$ 80.95
12-212-2	280	280	230	230	480	480	$ 80.95
12-213-3	292	292	244	244	501	501	$ 87.95
12-214-4	305	305	253	253	525	525	$102.50
CHEVY V8: 396, 402, 427, 454							
11-207-3	270	270	224	224	510	510	$ 87.95
11-208-3	280	280	230	230	520	520	$ 87.95
11-213-3	292	292	244	244	550	550	$ 87.95
11-214-4	305	305	253	253	575	575	$102.50

MAGNUM ROLLER TIP ROCKER ARMS
CALL FOR PRICE

COMPETITION CAMS

ROLLER LIFTERS

#818 S.B. Chevy
#819 B.B. Chevy
Call For Price

COMPETITION CAMS

Camshaft Degree Kit

Includes **free video,** 9" degree wheel 1" travel dial indicator, adjustable stand, piston stop, pointer, instructors and two checking springs.

#4796..........**$129.95**

COMPETITION CAMS High Energy Lifter

S.B. & B.B. Chevy
#812-16..................**$62.95**

COMPETITION CAMS Stainless Steel One Piece Valve

6000-1 S.B. Chevy Int. 2.02	$7.50 ea.
6005-1 S.B. Chevy Int. 1.940	$7.50 ea.
6008-1 S.B. Chevy Int. 2.055	$8.40 ea.
6010-1 S.B. Chevy Exh. 1.600	$7.50 ea.
6015-1 S.B. Chevy Exh. 1.500	$7.50 ea.
6020-1 B.B. Chevy Exh. 1.720	$8.40 ea.
6025-1 B.B. Chevy Exh. 1.880	$8.40 ea.
6030-1 B.B. Chevy Int. 2.065	$9.30 ea.
6035-1 B.B. Chevy Int. 2.190	$9.30 ea.

COMPETITION CAMS

Variable Duration
Magnum High-Tech Lifters
#870-16
S.B. & B.B. Chevy........**$65.95**

COMPETITION CAMS

Vacuum Canister

#5200...............**$39.95**

RICHMOND GEAR

Street Gears

GM 10 Bolt 8.5" 30 Spline

3.70 #49-0033-1	$162.95
3.73 #49-0041-1	$164.95
3.90 #49-0034-1	$162.95
4.10 #69-0165-1	$153.95
4.56 #69-0167-1	$153.95
4.88 #69-0169-1	$153.95

GM 10 Bolt 8.2" 25 Spline

3.55 #49-0015-1	$176.95
4.11 #69-0159-1	$137.95

GM 12 Bolt (Car)

3.73 #49-0039-1	$139.95
4.10 #69-0031-1	$137.95
4.56 #69-0032-1	$132.95

Ford 9"

3.50 #49-0027-1	$159.95
3.89 #69-0177-1	$160.95
4.11 #69-0179-1	$148.95
4.56 #69-0185-1	$156.95
4.86 #69-0067-1	$159.95
5.14 #69-0068-1	$169.95
5.43 #69-0069-1	$169.95
5.67 #69-0070-1	$169.95
6.00 #69-0199-1	$179.95

CLEVITE

Clevite 77 Bearings

350 Chevy Rod Bearings	$16.95
350 Chevy Main Bearings	$18.95
400 Chevy Main Bearings	$31.95
B.B. Rod Bearings	$24.95
B.B. Chevy Main Bearings	$29.95

H Bearings

350 Chevy Rod Bearings	$44.95
350 Chevy Main Bearings	$44.95
400 Chevy Main Bearings	$44.95
454 Chevy Rod Bearings	$59.95
454 Chevy Main Bearings	$59.95

B&M

Pro Stick Shifters

80701 3-Spd, front w/o cover	$108.95
80706 3-Spd, front w/ cover	$147.95
80702PG, front exit cable	$137.95
80703 PG, rear exit cable	$174.95
80715 Aluminum mount Brkt.	$39.95
80717 Aluminum cover	$37.95

CHROME VALVE COVERS

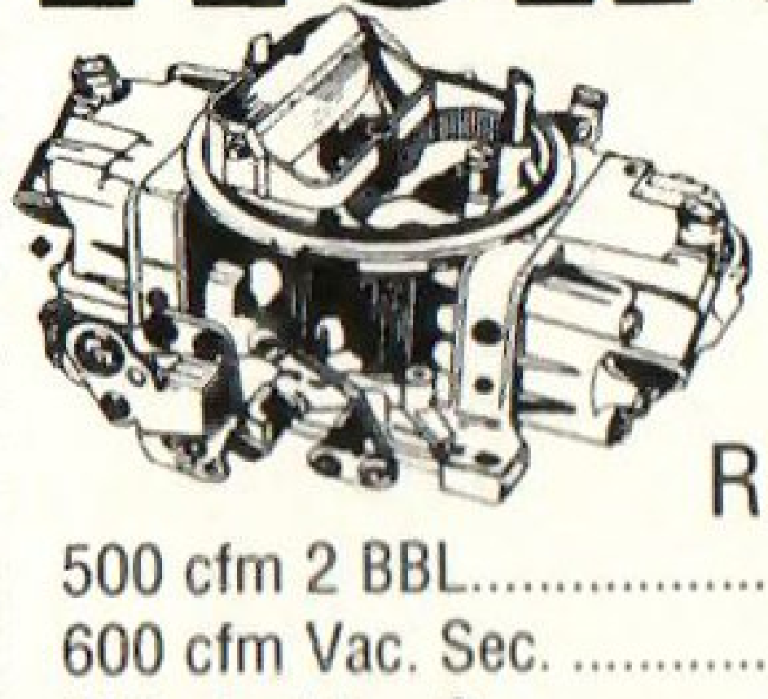
S.B. Chevy Short	$24.95
S.B. Chevy Tall	$24.95
B.B. Chevy Short	$29.95
B.B. Chevy Tall	$29.95

COMPETITION CAMS Pro Magnum Rockers

Competition cams pro magnum roller rocker arms combine the strength of 4340 chromemoly steel and the light weight of aluminum rockers!

1301 Chevy 265-400 3/8" 1.52	$214.95
1304 Chevy 265-400 7/16" 1.52	$224.95
1302 Chevy 265-400 3/8" 1.6	$224.95
1305 Chevy 265-400 7/16" 1.6	$224.95
1320 Chevy 396-454 7/16" 1.7	$229.95

Holley BRAND



BRAND NEW NOT REBUILTS!

500 cfm 2 BBL	$177.56
600 cfm Vac. Sec.	$185.03
750 cfm Vac. Sec.	$193.92
600 cfm Dbl. Pumper	$237.88
650 cfm Dbl. Pumper	$259.01
750 cfm Dbl. Pumper	$321.62
850 cfm Dbl. Pumper	$381.83

Holley Perf. Carb.
Universal Bolt on 600 cfm. With Electric Choke Design for use with Edelbrock Performer Manifold
#80457.....***Call for price***

FREE HOLLEY T-SHIRT OR HAT WITH EVERY CARB. PURCHASED!

COMPETITION CARBURETORS

with annular boosters:

1050 cfm- 09375	$527.58
1150 cfm- 09377	$550.38
850 cfm- 09380	$448.42
750 cfm- 09379	$401.89

conventional boosters:

1050 cfm- 08896	$494.19
1150 cfm- 07320	$578.26
660 cfm- 04224	*call for price*
450 cfm- 09776 T-RAM CARBS	$157.95

ELECTRIC FUEL PUMPS:

12-801 (street)	$62.41
12-802 (race)	$79.02

With Pressure Regulator

Holley BRAND

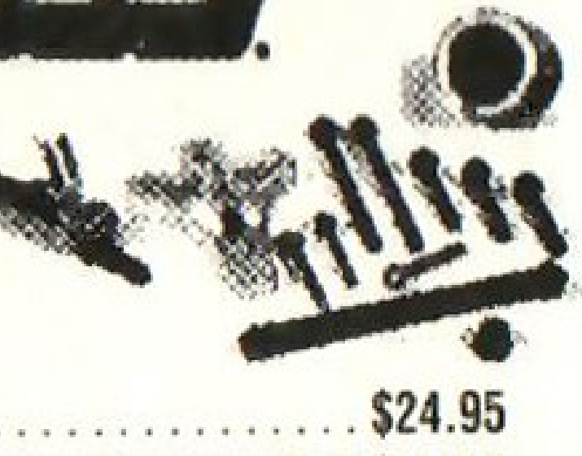
CHROME MECHANICAL FUEL PUMPS:

12834 S.B. Chevy	$42.75
12-835 B.B. Chevy	$42.75

MECHANICAL HI-PERFORMANCE RACE PUMPS:

12-327110 G.P.H S.B. Chevy	$49.98
12-454 110 G.P.H. B.B. Chevy	$50.70
12-327-2 130 G.P.H. S.B. Chevy	$58.77
12-454-2 130 G.P.H B.B. Chevy	$60.23

MOROSO



Engine Building Tools

61820 Brush cleaning kit	$24.95
61740 Harmonic Balancer Installing Tool S.B.	$26.95
61741 Harmonic Balancer Installing Tool B.B.	$26.95
61760 Crankshaft Socket Tool S.B.	$21.95
61770 Crankshaft Socket Tool B.B.	$21.95
62200 Oil Pump Primer	$14.95
62390 Valve Seat Pressure Tester	$59.95

PERFORMANCE PRODUCTS FELPRO

GASKET SETS:

S.B. Chevy	$29.95
S.B. Chevy 400	$34.95
B.B. Chevy	$39.95

fluidampr
performance harmonic dampers

#712615-6¼"	O.D. S.B. Chevy Int. Bal.	$219.95
#712430-7¼"	O.D. S.B. Chevy Int. Bal.	$282.95
#712465-8"	O.D. S.B. Chevy Ext. Bal.	$310.95
#712100-8"	O.D. B.B. Chevy Int. Bal.	$319.95
#712105-8"	O.D. 454 Ext. Bal.	$299.95

SEALED POWER

PERFORMANCE LIFTERS

Hydraulic
S.B. & B.B.
Chevy
$32.95 Others **$39.95**

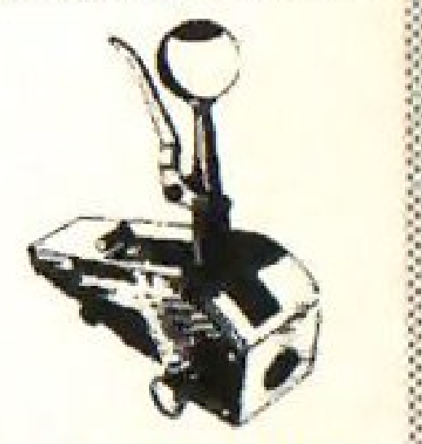
STOCK CAM & LIFTERS
from **$74.95**

CLOYES

HEAVY DUTY DOUBLE ROLLER CHAIN SETS

S.B. Chevy 3023X	$17.95
B.B. Chevy 3024X	$19.95

HURST SHIFTERS



LINE LOCKS...*CALL FOR PRICE*

QUARTER STICKS:

316-0001 powerglide	***CALL***
316-0006 turbo	***FOR***
316-0009 Ford, Chrys	***PRICE***

B&M

AUTOMATIC SHIFTERS

MEGA SHIFTER	$139.95
STAR SHIFTER	$139.95
QUICKSILVER	$139.95
Z-GATE	$ 94.95
TRUCK MEGA SHIFTER	$149.95

350 CHEVY TRW FORGED 11:1 PISTONS

AVAILABLE STD-30-60
#L2304F
SET OF 8 **$239.95**

K&N

AIR FILTERS

'96 VORTEC TRUCK E1796	$48.95
'87-'95 CHEVY TRUCK E1500	$34.95

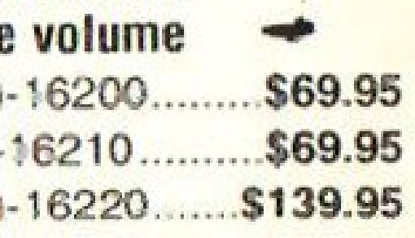
Milodon INC.

HIGH-VOLUME WATER PUMPS

- **direct replacement**
- **no engine modifications**
- **up to 30% more volume**

S.B. Chevy (short)-16200	$69.95
S.B. Chevy (long)-16210	$69.95
B.B. Chevy (short)-16220	$139.95
B.B. Chevy (long)-16225	$99.95

Milodon INC.



LOW PROFILE OIL PANS

6qt.capacity

S.B. Chevy pre 1980 #30900	$129.95
B.B. Chevy #30950	$159.95

(Pick-Ups not included)

1-602-264-5288 1-602-264-5285

FREE SHIPPING UP TO 150 LBS.
UPS GROUND CONTINENTAL U.S. ONLY

916 E. INDIAN SCHOOL RD.
PHOENIX, AZ 85014
FAX # 602-264-5749

$3.25 Package & Handling Charge Per Order

NOT LEGAL FOR SALE OR USE ON CALIFORNIA POLLUTION EQUIP MOTOR VEHICLES

VDO

EDELBROCK PERFORMER MANIFOLD
S.B. Chevy ***$102.95***

Holley 4 barrel carb.
600 cfm man. choke ***$185.03***

TRANS-DAPT

TAYLOR

SPARK PLUG WIRES:

Choice of colors-
Black, Red, Orange, Yellow, Blue

PRO-WIRES....$39.95

Holley MAIN JET KIT

2 Each #64 to #99 Jets
#36-181................**$29.95**

Hamburger's OIL PANS

ULTRA-LITE HIGH TORQUE MINI STARTERS
$159.50
Chevy only

HUGHES

"STREET MASTER" "HI-STALL" CONVERTERS

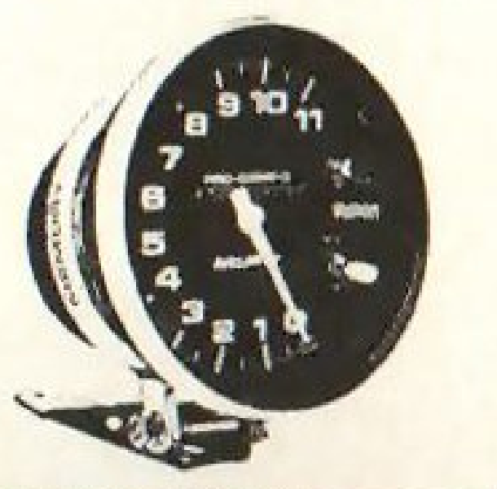
2000 stall ... **$98.95**
GM 2500...**$125.00**

Auto Meter COMPETITION INSTRUMENTS

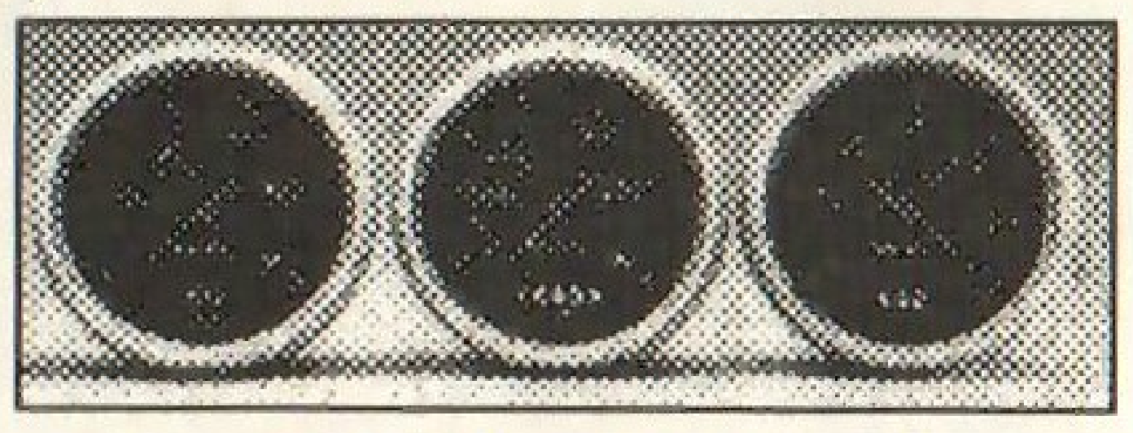
5" DIAMETER MONSTER TACHS

#3900-10,000 rpm
#3980-8,000 rpm

$84.95



Auto Meter COMPETITION INSTRUMENTS



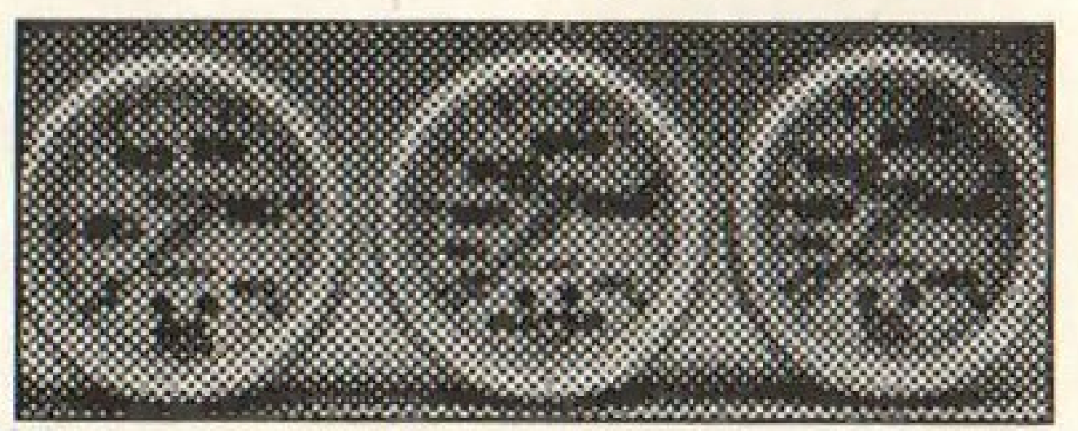
2⁵/₈ Sport Comp or Liquid filled Pro Comp:

Mechanical, Track-Proven Gauges:	Sport Comp	Pro Comp
Fuel Pressure 1-15 psi	$27.50	$35.95
Water Temp 120-240°F	$40.95	$57.95
Water Temp 140-280°F	$40.95	$57.95
Oil Pressure 0-100 psi	$27.95	$36.95

Auto Meter Pro Comp II Monster Tachs
5" Face, Memory Recall displays highest RPM reading made on last run. Not for magnetos.

#6809 9,000RPM	$119.95
#6811 11,000 RPM	$139.95

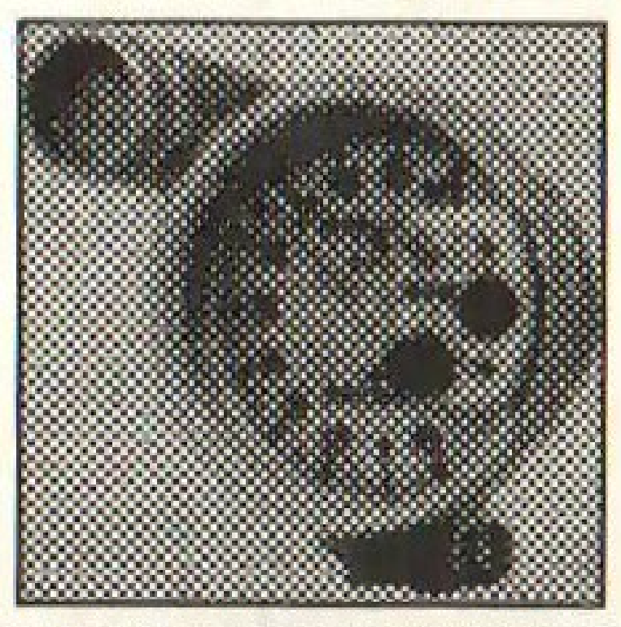
Auto Meter COMPETITION INSTRUMENTS



Ultra-Lite Gauges 2⁵/₈" Diam. Mechanical Gauges

#4411 Fuel pressure, 0-15 PSI	$ 37.95
#4413 In-dash fuel pressure with isolator, 0-15 PSI	$102.95
#4421 Oil pressure, 0-100 PSI	$ 37.95
#4431 Water temperature, 140°- 280°F	$ 59.95
#4432 Water temperature 120°- 240°F	$ 59.95
#4471 Vacuum 30" HG	$ 39.95
#4401 Boost, 30" HG-20 PSI	$ 47.95

Auto Meter COMPETITION INSTRUMENTS



Sport Comp Silver
5" Shift-Lite Tachometer
#3911 10,000 RPM...... **$174.95**

CRANE Cams

MAX VELOCITY CAMS
INCREASED LOW END & MID RANGE
HYDRAULIC
$79.95

MAKE & PART #	DUR. IN.	DUR. EX.	DUR.@.050 IN.	DUR.@.050 EX.	LIFT IN.	LIFT EX.	PRICE
CHEVY V8: 265, 283, 302, 307, 327, 350, 400							
113901	260	272	204	216	427	454	$79.95
113941	272	284	216	228	454	480	$79.95
113801	278	290	222	234	467	494	$79.95
CHEVY V8: 396, 402, 427, 454							
133901	260	272	204	216	484	515	$79.95
133941	272	284	216	228	515	510	$79.95
133801	278	290	222	234	529	525	$79.95

CRANE Cams

STUD GIRDLES:
S.B. Chevy **$129.95**
B.B. Chevy **$159.95**

CRANE Cams

Blueprinted Camshafts

968711 300 HP 327 Chevy Hyd.	$61.95
967601 350 HP 327 Chevy Hyd.	$61.95
969551 330 HP 350 Chevy Mech.	$61.95
967251 290 HP 302 Chevy Mech.	$61.95
968811 325 HP 396 Chevy Hyd.	$61.95
969391 375 HP 396 Chevy Hyd.	$61.95
969961 375 HP 396 Chevy Mech.	$61.95

CRANE Cams

Roller Tip Rockers
Small Block Chevy
#11806-16 1.5 Roller Tip set of 16....**$99.95**
#11807-16 1.6 Roller Tip set of 16....**$109.95**

CRANE Cams

Crane's variable duration lifters give you more bottom end torque, horsepower, and manifold vacuum and still retain your top end power.

SB and BB Chevy #99377-16
$63.95

HOOKER HEADERS

HOOKER COMPETITION HEADERS

Made from 16 gauge tubing. Available for CAMARO, NOVA, CHEVELLE, EL CAMINO, CORVETTE, BLAZER and 1/2, 3/4, 1 ton trucks, 2W or 4W drive.

S.B. Chevy.............**$117.95**
B.B. Chevy.............**$129.95**

HOOKER HEADERS *CALL FOR INFO AND PRICING*

AERO CHAMBER MUFFLERS

MSD IGNITION

STREET/STRIP	
6200-6A BOX	$119.95
WITH REV CONTROL	
6420-6AL BOX	$159.95
CIRCLE TRACK	
6400-6T BOX	$139.95
6 BTM 6 AL w/Boost Timing Master	
6462	$299.95
7 AL-2 RACE ONLY	
7220	$268.95
MAG PICK-UP BILLET DIST CHEVY	
85551	$179.95
MAG PICK-UP BILLET DIST w/VAC-ADV	
8361	$169.95
BLASTER Z COIL FOR MSD IGNITION	
8202	$ 28.50
SUPER HEI KIT w/6A BOX	
8400	$174.95
HELI-CORE 8MM PLUG WIRE FOR USE w/MSD BOXES	$49.95

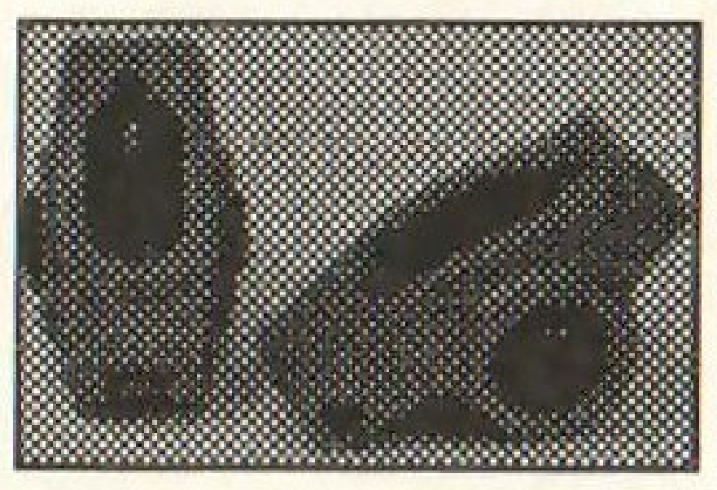
Carter® AFB CARBS

Electric Chokes:
(9504) 500 cfm, Chevy **$219.95**
(9635) 625 cfm, Chevy **$222.95**
(9636) 625 cfm, Chrys. **$249.95**

Manual Chokes:
(9503) 500 cfm **$209.95**
(9605) 600 cfm............**$179.95**
(9755) 750 cfm............**$204 .95**

Electric Fuel Pumps:
(P4070) 5 PSI Street.......**$45.95**
(P4594) 7 PSI Street/Strip...**$49.95**

CRANE Cams



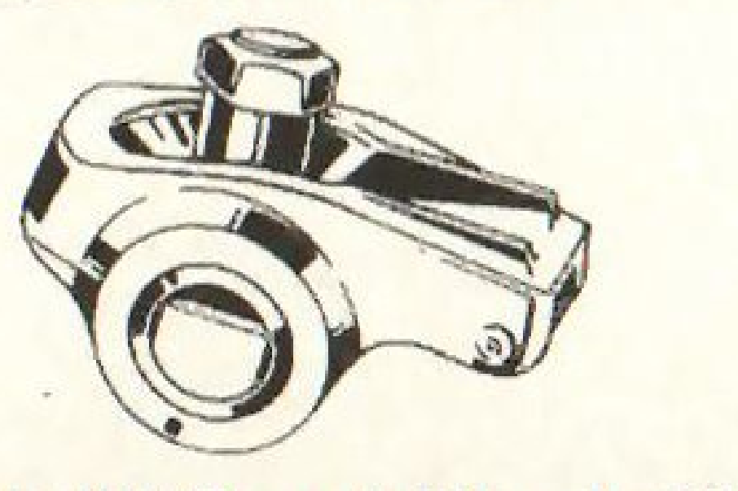
Extruded Aluminum Rockers

Crane's famous "Gold" rocker is the strongest available. Reliable to 11,000 RPM!

11750-16 SB Chevy 1.5, 3/8"	$237.99
11752-16 SB Chevy 1.5, 7/16"	$268.99
11755-16 SB Chevy 1.6, 7/16"	$278.99
13750-16 SB Chevy 1.7, 7/16"	$259.99

CRANE Cams

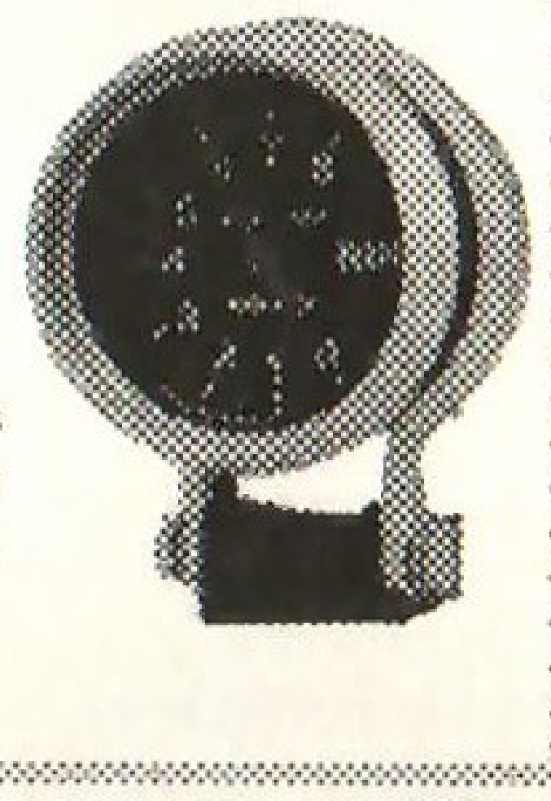
HIGH INTENSITY
Aluminum, Needle Bearing, Roller Rockers



1955-86 Small Block Chevy	
11744-16 1.5 ratio 3/8" stud	$169.95
11746-16 1.6 ratio 3/8" stud	$169.95
11747-16 1.6 ratio 7/16" stud	$169.95
1965-89 Big Block Chevy	
13744-16 1.7 ratio 7/16" stud	$169.95

Auto Meter Sport Comp Mini Tachometer

Auto Meter COMPETITION INSTRUMENTS



Good to 8,000 RPM, this 2 5/8" diameter tach is perfect for tight cockpits. Comes with rubber-liner shock strap, pointer, and 12 volt lighting. For 4, 6 and 8 cylinder engines.
#3708.......................................$72.75

ARP
BOLTS & STUDS

HEAD STUDS S.B. CHEVY	$89.95
HEAD STUDS B.B. CHEVY	$94.50
MAIN STUDS S.B. CHEVY 2 BOLTS	$34.95
MAIN STUDS S.B. CHEVY 4 BOLTS	$49.95
MAIN STUDS B.B. CHEVY 2 BOLTS	$44.95
MAIN STUDS B.B. CHEVY 4 BOLTS	$69.95
ROD BOLTS (ALL APPLICATIONS	$39.95

R&M Billet Wire Looms
Loom has billet aluminum bracket, with molded wire insulators. Your choice of satin, polished, red, blue anodized.
1101 SB Chevy to 1986,
1102 BB Chevy.........**$39.95**

SPEED-PRO
Plasma moly piston ring sets file fit

4" Bore 5/64", 5/64", 3/16" #R9343	$79.95
4" Bore 1/16", 1/16", 3/16" #R9771	$84.95
4.125" Bore 5/64", 5/64", 3/16" #R5879	$89.95
4.125" Bore 1/16", 1/16", 3/16" #R10248	$99.95
4.250" Bore 5/64", 5/64", 3/16" #R9590	$84.95
4.250" Bore 1/16", 1/16", 3/16" #R9344	$79.95

Blueprint Series Vaccum Advance Distributors:

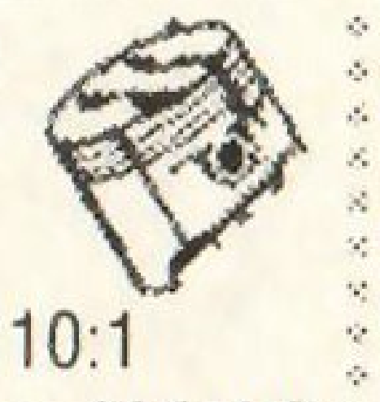
ACCEL *...the good stuff!*

9107 CHEVY HEI V-8..........**Call for price**

DRIVESHAFT SAFETY LOOPS
$24.95

LAKEWOOD

STERLING CAST PISTONS



350 Chevy 10:1 compression #345NP
set of 8 ....**$54.95**

TAYLOR

TRUNK MOUNT BATTERY KITS $39.95
Includes tray, hold down brackets, 16' starter cable, 2' ground strap & all mounting hardware.

CLOYES

True Roller Timing Sets
#9-1100 SB Chevy '55-94....................**$39.95**
#9-1110 BB Chevy '65-94....................**$39.95**

MANLEY

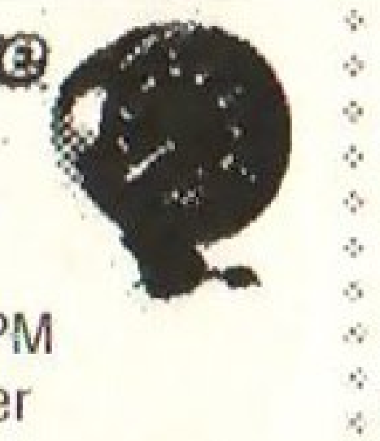
CHROME MOLY PUSH RODS
5/16 stock length
S.B. Chevy ***$32.95***

NEW CHEVROLET HARMONIC BALANCER'S

6 3/4"	$69.95
400	$69.95
8"	$69.95
454	$69.95

Auto Meter COMPETITION INSTRUMENTS

Autogage



STREET TACHS
- Zero-8,000 RPM
- 3 3/4" diameter
- Redline pointer

Black #2300............**$39.95**
Chrome #2301.........**$45.95**

MANLEY

ALUMINUM RODS:
#14004 5.700 SB Chevy........**$475.00**
#14006 6.000 SB Chevy........**$475.00**
#14001 6.135 BB Chevy........**$525.00**

H-BEAM STEEL RODS:
#14050 5.700 SB Chevy..**$575.00**
#14054 6.000 SB Chevy..**$575.00**
#14060 6.135 BB Chevy..**$675.00**
#14062 6.385 BB Chevy..**$675.00**
#14066 6.535 BB Chevy..**$675.00**

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Hi-Volume Oil Pumps

SB Chevy
#224-4143..........**$19.95**
BB Chevy
#224-4153..........**$23.95**

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64CC or 72 Chambers 2.02 x 1.60 Stainless Valves, Hardened Seats 3/8 Studs & Guide Plates 3 Angle Valve Job, Dual Springs, Retainers, Locks,
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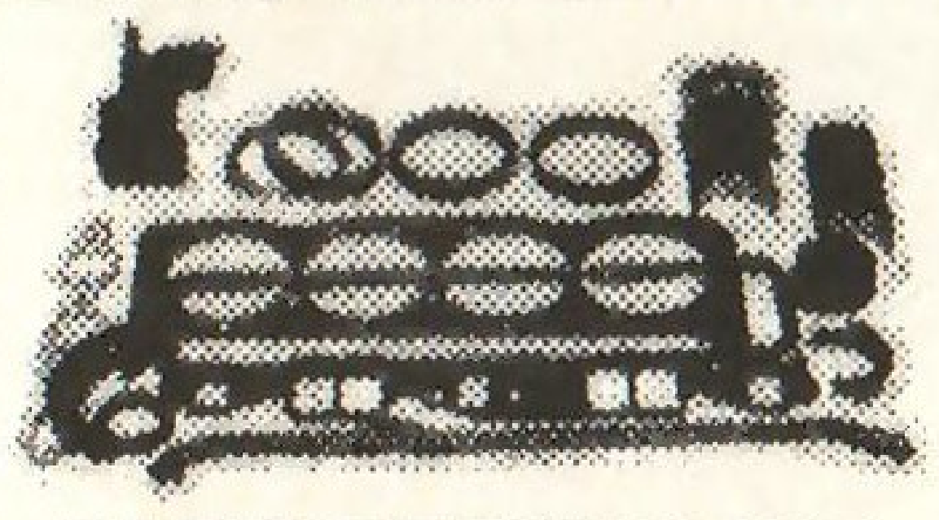

BASIC REBUILD KIT
Pre-1985 engines
Basic rebuild kit includes: CL77 rod & main bearings, sealed power cast rings, standard oil pump and FEL-PRO gaskets.

Chevy 305, 350	$89.95
Chevy 283, 307, 327	$89.95
Chevy 400 SB	$99.95
Chevy BB	$119.95

Options:
Moly rings add $10.00
High volume oil pump add $5.00

FLOWMASTER MUFFLERS

2 chamber	**$51.95** each
3 chamber	**$62.95** each
Crossflow muffler '83-'92 Camaro #42583	**$71.95**

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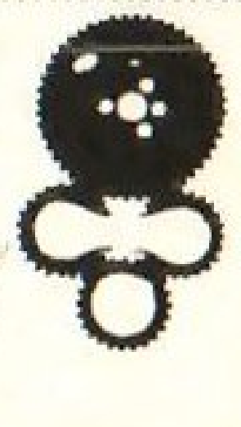
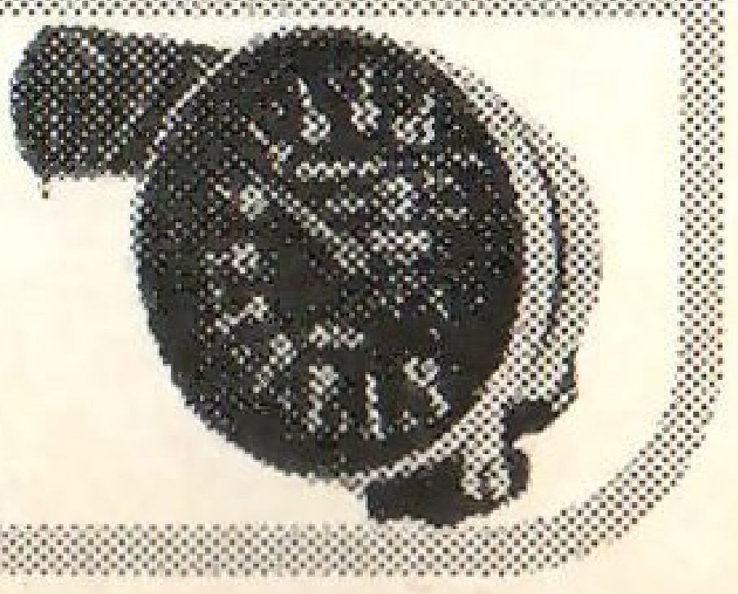


ACCU-DRIVE

S.B. Chevy
#7890 ....**$149.95**
B.B. Chevy
#7891.......................**$164.95**

Auto Meter

5" SPORT-COMP SHIFT-LITE TACHS



Big 5" face with yellow light indicates your pre-set shift settings.
#3903 In-dash Shift-Lite tach 10,000 RPM **$122.50**
#3904 Separate Shift-Lite tach 10,000 RPM **$139.95**

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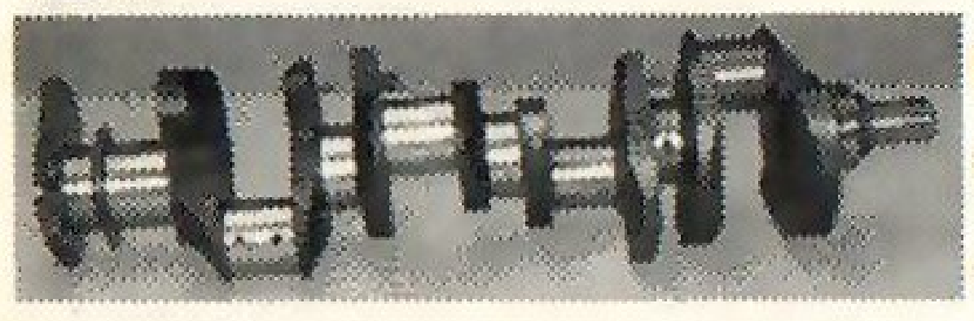
Stock To Performance... We've Got Your Part

SCAT Crank



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#103750 383 Chevy Stroker	**$239.95**
#104000 400 Stock Crank	**$239.95**

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Increases torque and horsepower output in stock or mildly modified pre-computer V8 engines.

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Rering Kits Include

Piston Rings, Rod/Main Bearings, and Gasket Set

Cam Kits Include

Camshaft, Valve Lifters, and Timing Components

Chevy	Year	Master	Rering	Cam
283	58-67	$284.95	$99.95	$69.95
305	76-80	$219.95	$74.95	$69.95
327	62-67	$299.95	$84.95	$69.95
350	**69-85**	**$154.95**	**$69.95**	**$59.95**
400 S/B	70-80	$299.95	$99.95	$69.95
427	66-69	$484.95	$104.95	$84.95
454	71-85	$349.95	$104.95	$79.95
Ford	**Year**	**Master**	**Rering**	**Cam**
302	68-84	$236.95	$79.95	$74.95
351W	70-86	$259.95	$89.95	$74.95
Chrysler	**Year**	**Master**	**Rering**	**Cam**
318	68-87	$279.95	$104.95	$89.95

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High Performance Kits Priced with Hypereutectic Pistons, Forged Pistons Also Available • Call for Pricing

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350 Chevy (to 1985) #HP350K	**$299.95**
351W Ford (to 1983) #HP351K	**$459.95**
454 B/B Chevy #HP454K	**$439.95**

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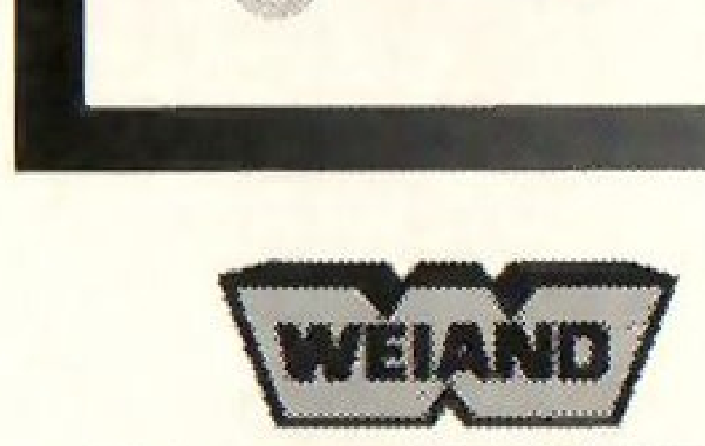
#01508 **$134.95**



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Rated line pull3,500 lbs., 12VDC removable switch, Hawse fairlead and brake, 7/32" x 50' wire rope

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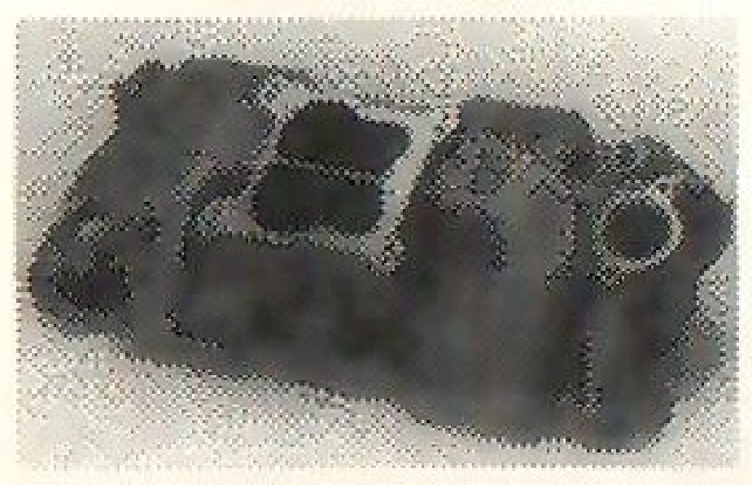
Superwinch Hubs Starting at $49.95



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Small Block Chevy Action Plus
#8004 **$89.95**
Small Block Chevy Stealth
#8016 **$104.95**

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Chevrolet
1.52" ratio 3/8" stud
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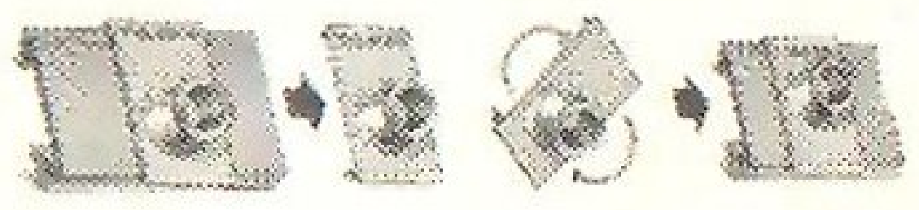

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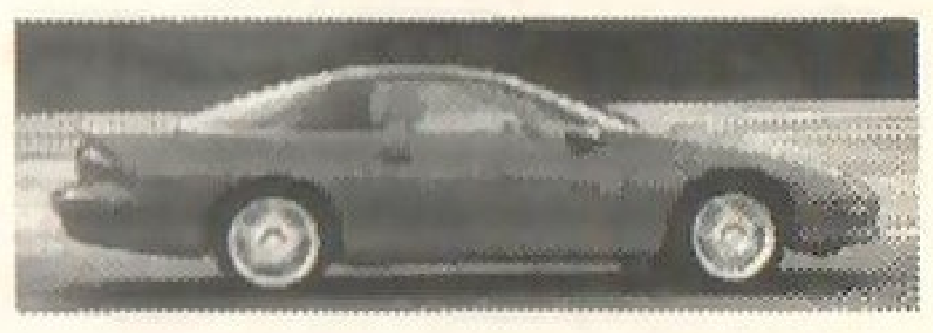
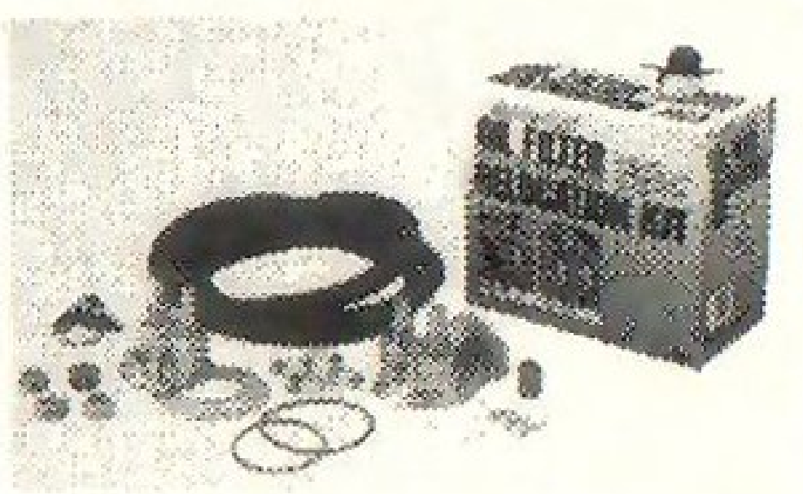
#57-3010 1993-95 Camaro V6-3.4L & V8-05.7L LT1
$224.25





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#10695 Single Oil Filter Mount Kit
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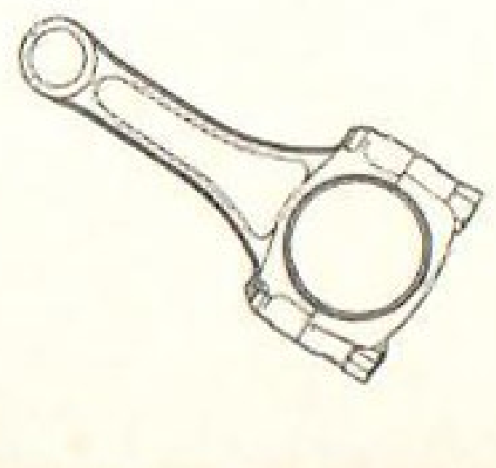

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REVERSE GEAR

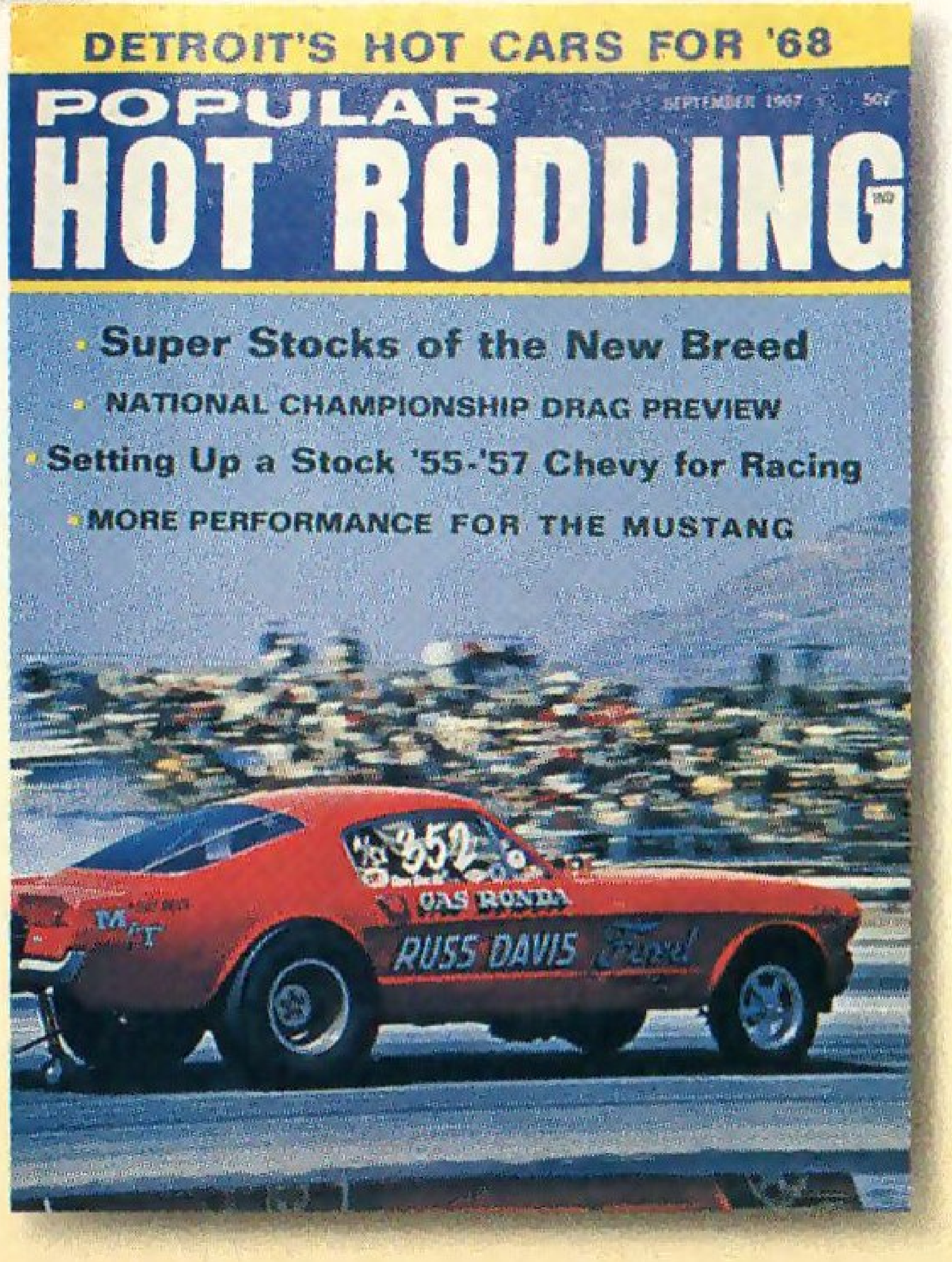
30 YEARS AGO: SEPTEMBER 1967

BLAIR'S SPEED SHOP

All American Match Racer

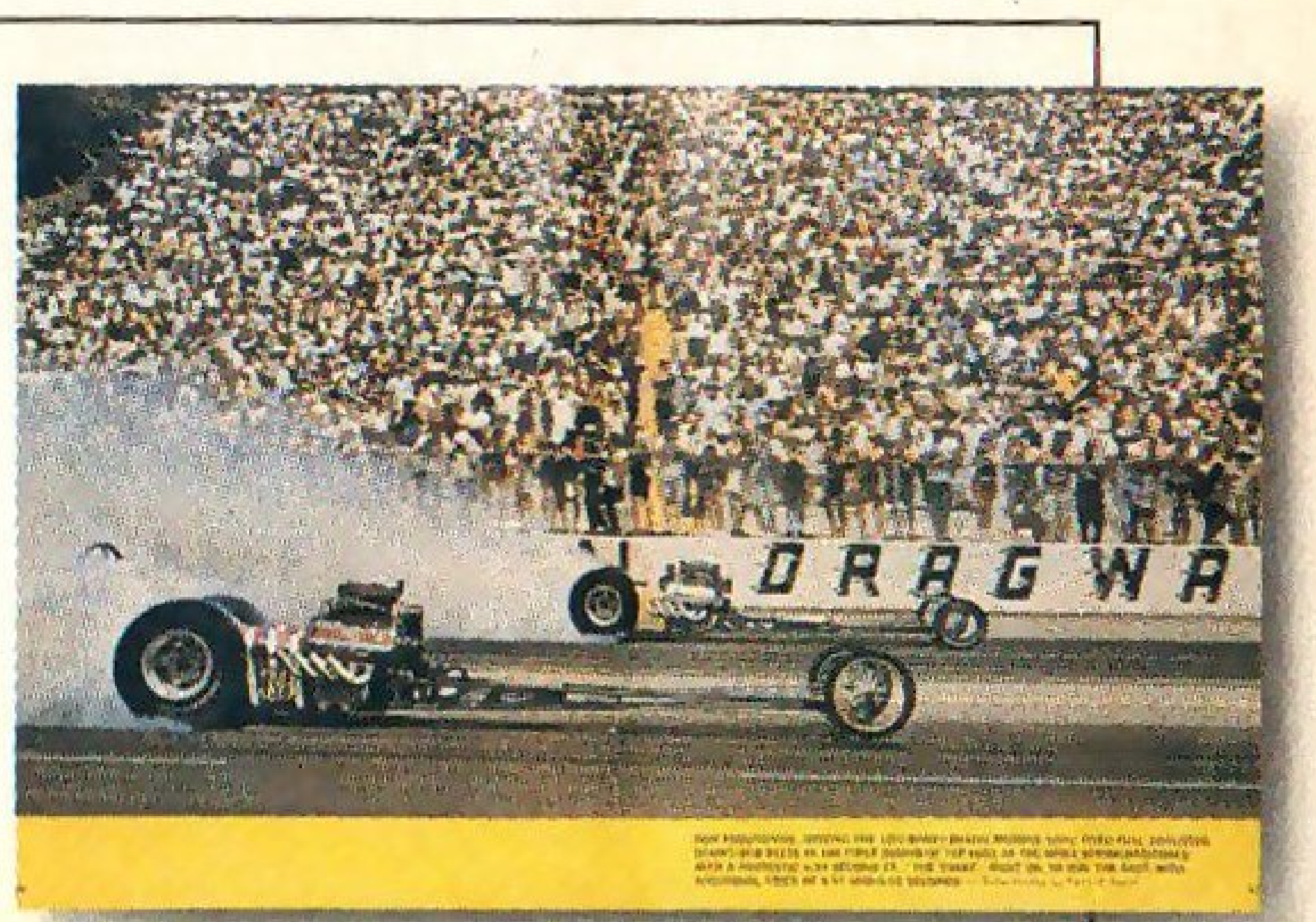
BLAIR'S BLASTER

Okay, so California was always well known for being the birthplace of hot rodding. Through their series of different race cars, Blair's Speed Shop in Pasadena, California, gained nationwide fame and notoriety, as well. Tom McMullen gave us a close-up look at the latest creation to come from this revered speed emporium. This 1967 Camaro Fuel Funny Car was powered by a stout big-block Chevy, using M/T aluminum rods, heads by Joe Mondello, Enderle injection, an Isky cam, and a Donnie Hampton blower. Steve Bovan shoed the flopper to times in the low 8s at over 170mph, in his second season in Funny Cars.

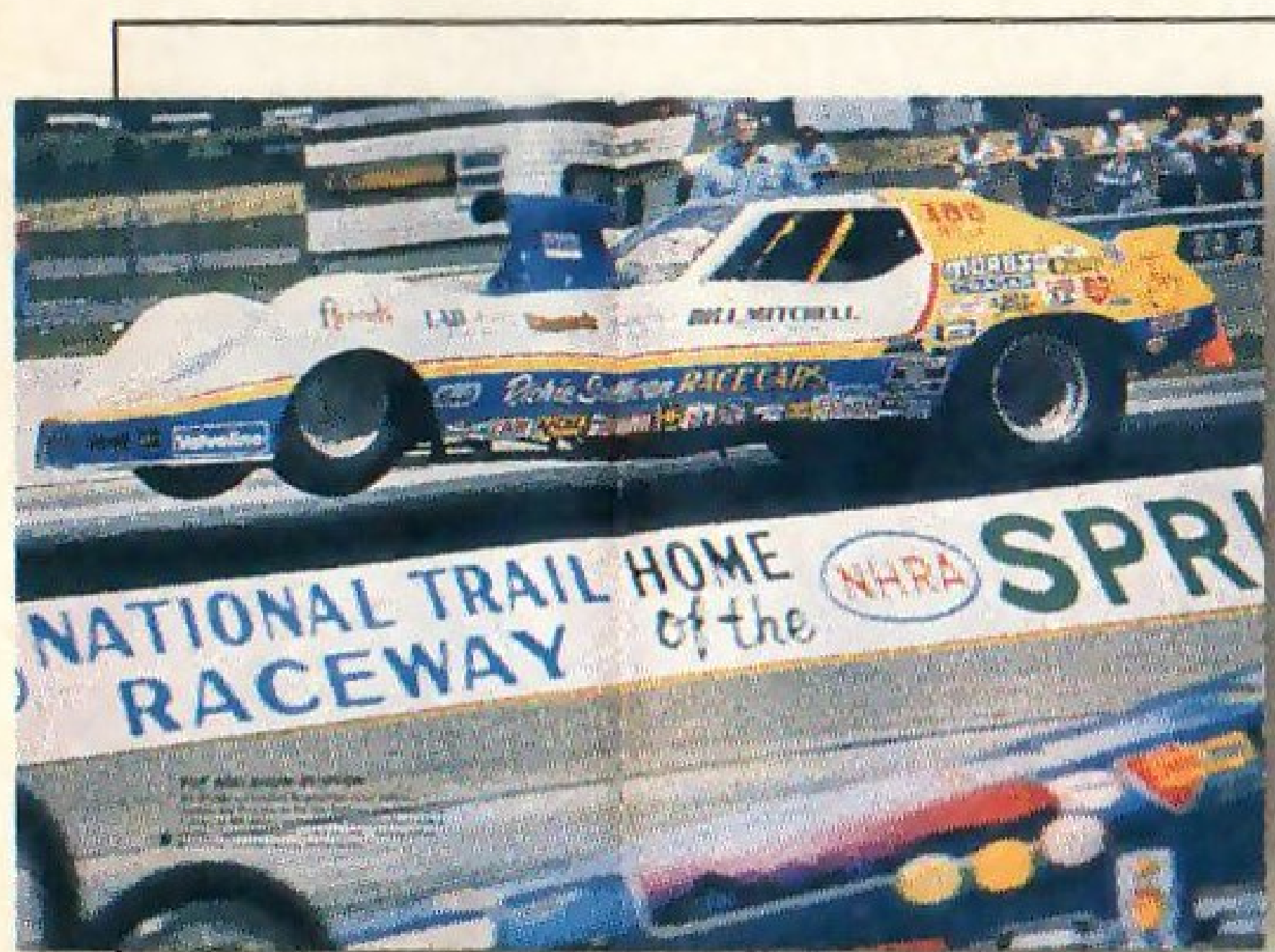

DETROIT'S HOT CARS FOR '68
POPULAR HOT RODDING
SEPTEMBER 1967 50¢
Super Stocks of the New Breed
NATIONAL CHAMPIONSHIP DRAG PREVIEW
Setting Up a Stock '55-'57 Chevy for Racing
MORE PERFORMANCE FOR THE MUSTANG
352
GAS RONDA
RUSS DAVIS Ford

SPRING IN BRISTOL

This dramatic shot shows the first round of AA/FD at the third annual NHRA Springnationals, which were held in Bristol, Tennessee back then. In the near lane, it's Don "The Snake" Prudhomme driving the Lou Baney Brand Motors SOHC Ford-powered dragster. In the far lane, Bob Reese tried hard in Jim and Allison Lee's car, but lost to the Snake's 6.99. Continuing his march through eliminations, Prudhomme beat Jimmy Nix, Mike Sorokin (in Roland Leong's Hawaiian), and then got the best of "Sneaky Pete" Robinson in the all-Ford final with a 6.92.



20 YEARS AGO: SEPTEMBER 1977


BILL MITCHELL
NATIONAL TRAIL RACEWAY
HOME of the NHRA SPR

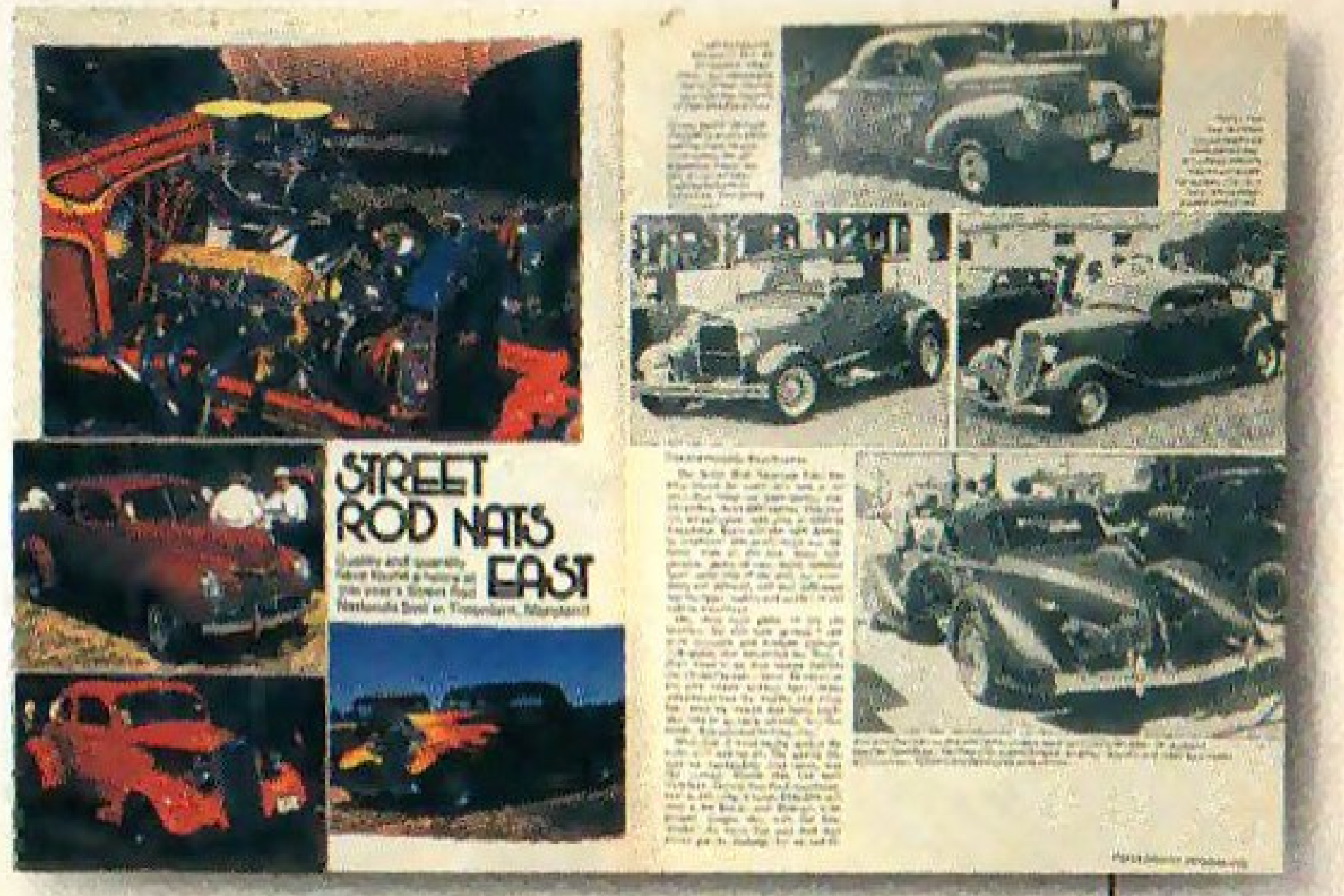
MITCHELL'S A MOVER!

Crafty Long Island, New York-racer, Bill Mitchell, was developing another way to go fast. His new B/Econo Altered Corvette Funny Car was a trendsetter. Shown here in a wheels-up launch during the NHRA Springnationals at National Trail Raceway, insiders knew it wouldn't be long until Bill had this new piece running on the National Record. The tall front tires (Moroso Drag Specials) offered more rollout on the starting line. These days, he's known for Bill Mitchell's Hardcore Race Products, and many other speed-related business ventures.

MOPAR Super Stock Tips!
SEPTEMBER 1977 $1.25
POPULAR HOT RODDING
NEW-1380cfm HOLLEY CARB!
HOW TO INSTALL HIGH-LIFT CAMS!
Dodge
STREET ROD NATIONALS EAST

EAST IS IT!

The Street Rod Nationals East has a rich heritage. Early events (like this one) were held in Timonium, Maryland, but the event grew so fast it was later moved to York, Pennsylvania, where it still is today. This 1977 "Nats East" found close to 1,200 entries, all 1948 and under (of course). Other than the car count, most feel the biggest difference was the build-quality of the cars. Most East Coast rodders used to say the weather and poor road conditions dictated how they built their rods, but we found that was no longer true at the Nats East.



STREET ROD NATS EAST

10 YEARS AGO: SEPTEMBER 1987

FAST ON GAS

COMP CRUISER

We profiled Ed Heck, an up-and-coming Comp Eliminator racer who stepped up in a big way by commissioning Don Ness to build his latest creation. Dubbed "Re-Entry," this new Firebird was centered on a tubular chassis, and tipped the scales at 2,050 pounds. Ness offered some built-in versatility, as well. With a 446ci engine, it fit into NHRA's B/Altered class. Dropping a 500-inch motor in the rails would give Ed the ability to run Pro Stock in NHRA or IHRA. Such foresight proved to be very helpful (or enticing) since that's exactly where Mr. Heck ended up.

25
Build A TEN-SECOND BRACKET BOMBER
POPULAR HOT RODDING
SEPTEMBER 1987 $2.00
Outrageous BOULEVARD BRUISERS
THE NEW PROJECT X
BACK TO SCHOOL SPECIAL:
NINE-INCH REAR ENDS FOR GM CARS
CARB SELECTION & TUNING TRICKS
PERFORMANCE COMPUTER CHIPS
TRANSMISSION REBUILDING TIPS

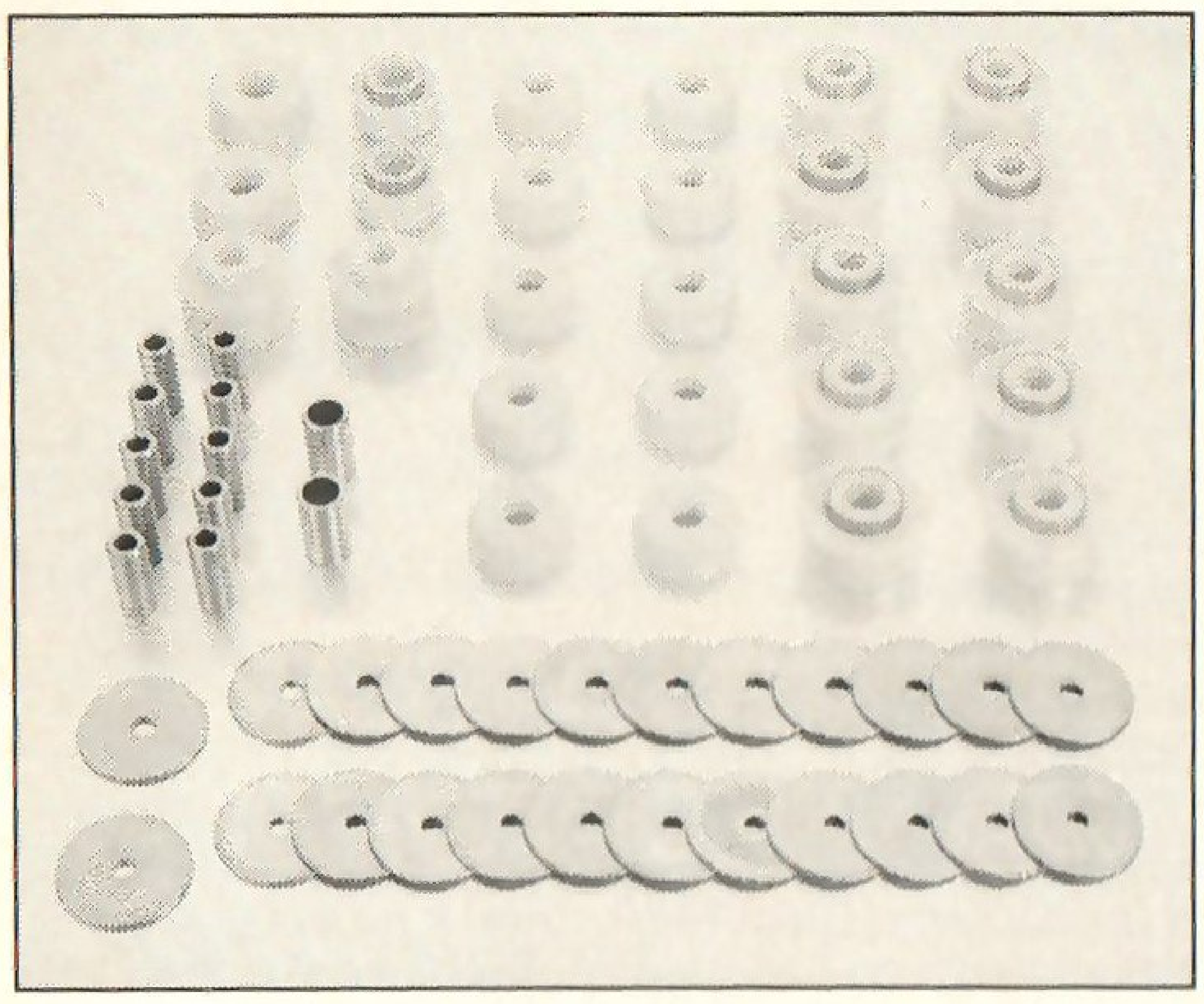
EYE OF THE TIGER

Looking back at "The Best Muscle Cars of the Past 25 Years," the 1965 GTO came out of the box roaring with muscle and attitude, to boot! The insurance companies couldn't help but notice — what with the mighty 389, and the increasingly popular Tri-Power option, which offered 360hp. This car had all the attributes that power-hungry gearheads were all shopping for. Many aficionados feel the '65 version to be the best for styling and overall appeal. With the hit song "Little GTO" by Ronnie and the Daytonas filling the airwaves, it's no wonder this car became known as "The Legend."

BEST MUSCLE CARS OF THE PAST 25 YEARS

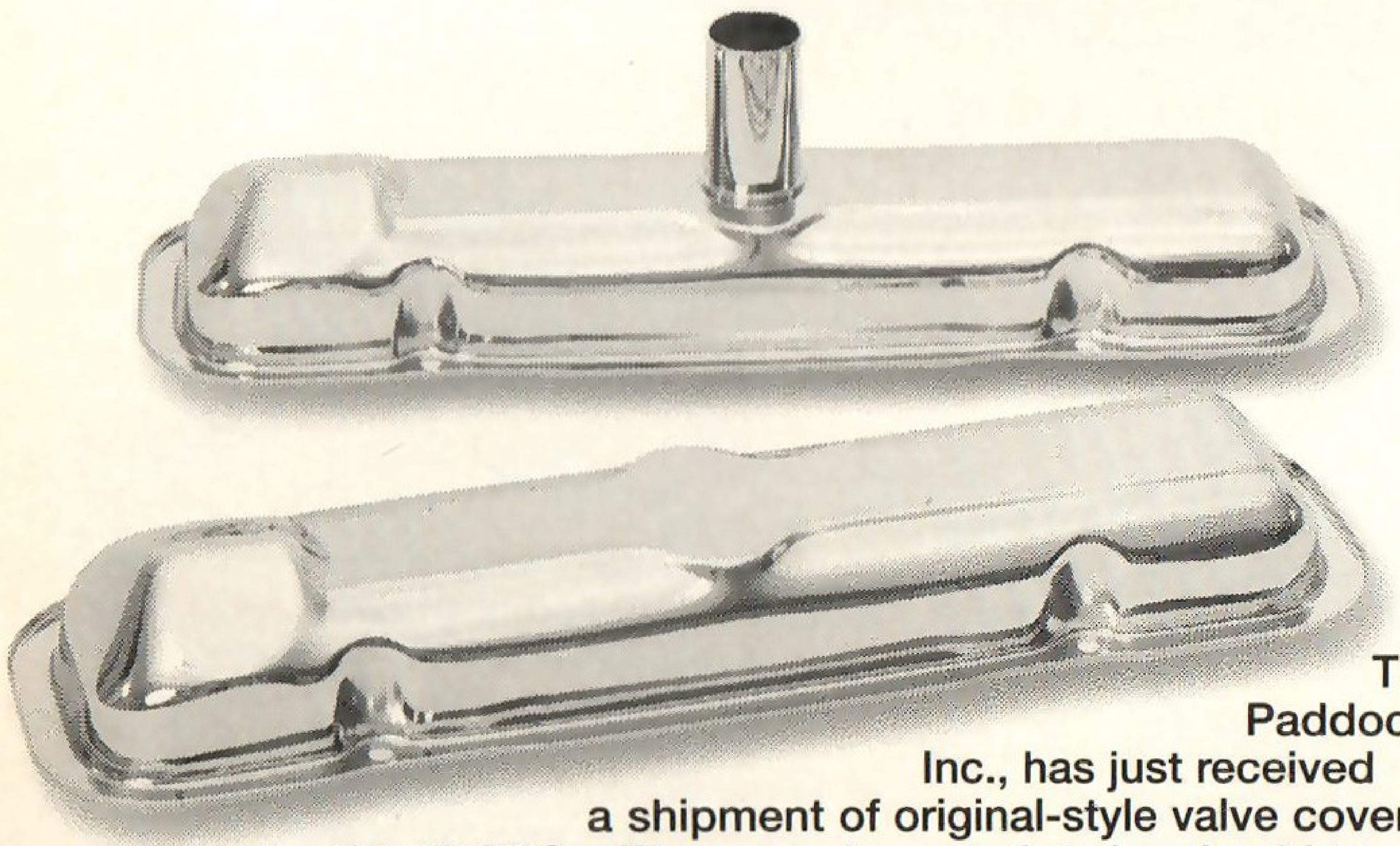
THE LEGEND

NEW PRODUCTS

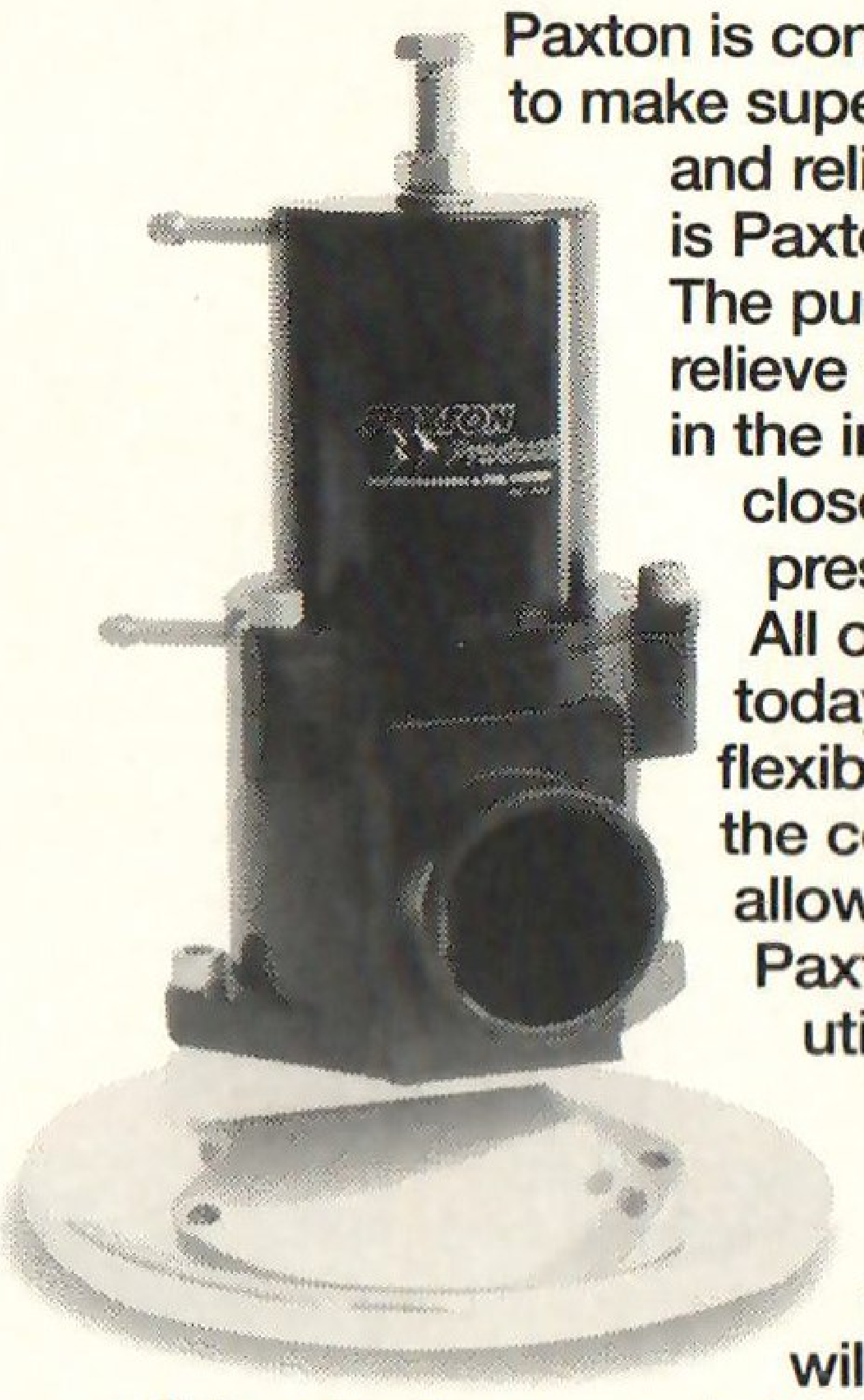


Energy Suspension, one of the world's largest manufacturers of polyurethane automotive suspension components, has added to its line Hyper-Flex polyurethane body mounts for '78 - 88 Chevrolet Monte Carlos. Other components for the Monte Carlo include sway bar bushings, end links, rear control arm bushings, ball-joint and tie-rod dust boots, and a performance polyurethane transmission mount. All bushings are full-floating and non-binding. The new body mounts also fit most A and G body GM cars. For more information, contact **Energy Suspension**, 1131 Via Callejon, Dept. PHR, San Clemente, CA 92673, (714) 361-3935.

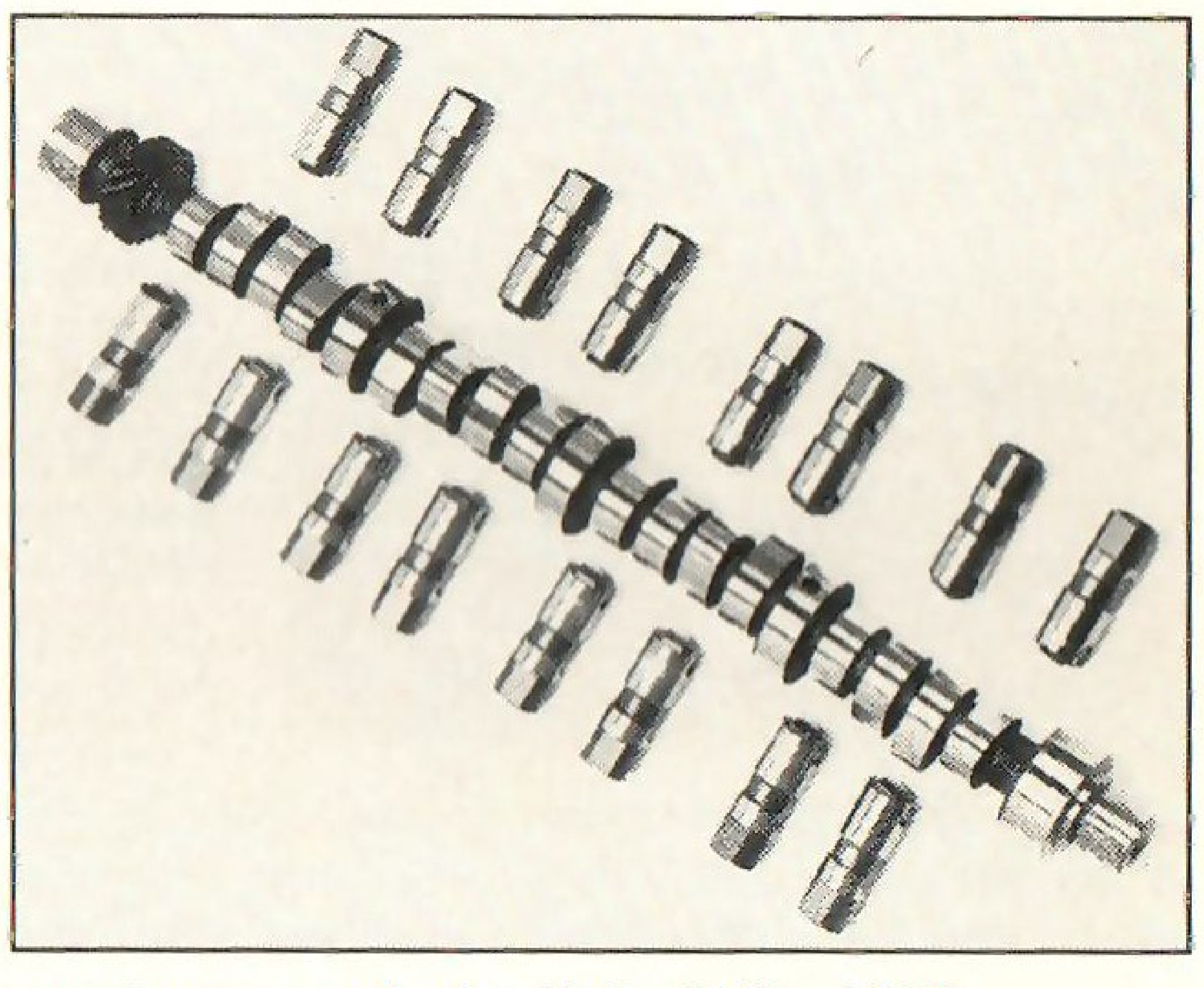
The '57 Chevy, is 40 years old, and Classic Chevy International is celebrating this landmark car's birthday with an exclusive jacket and cap. The 100 percent-cotton, sanded twill jacket has a nylon lining and knit trim, with a back emblem embroidered with nearly 46,000 stitches in red, white, turquoise, and gold. The matching cap is also embroidered in the same top quality stitching. Even if you can't own the real thing, the jacket and cap will let you honor this American car as it turns 40. For more information, contact **Classic Chevy International**, P.O. Box 607188, Dept. PHR, Orlando, FL 32860, (407) 299-1957.



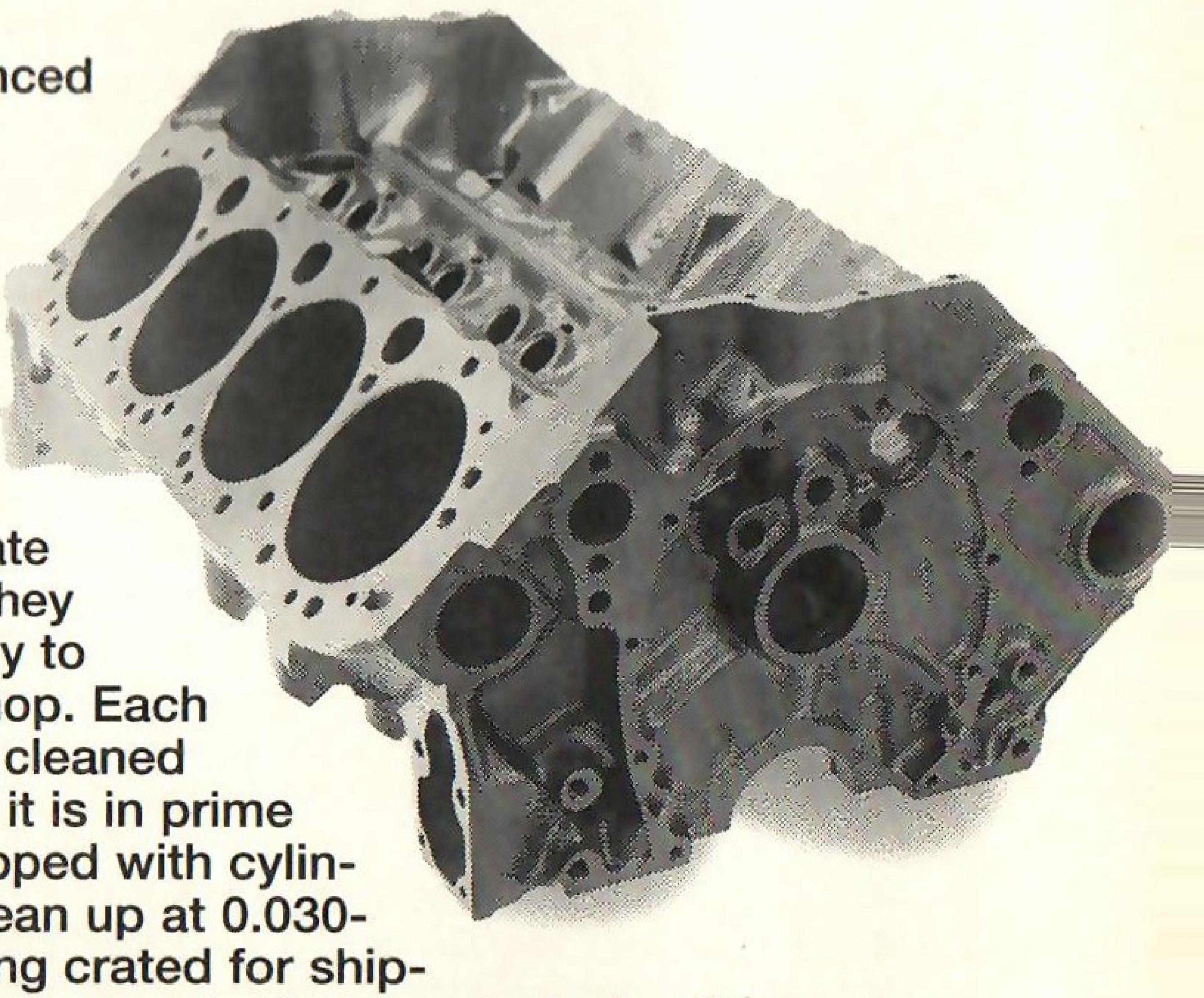
The Paddock, Inc., has just received a shipment of original-style valve covers for '64-66 GTOs. They are chrome-plated and sold in pairs. Score big at your next event with these high-quality covers. Call today and order the ones that suit your needs from **The Paddock, Inc.**, 221 W. Main St., P.O. Box 30, Dept. PHR, Knightstown, IN 46148, (800) 854-8532.



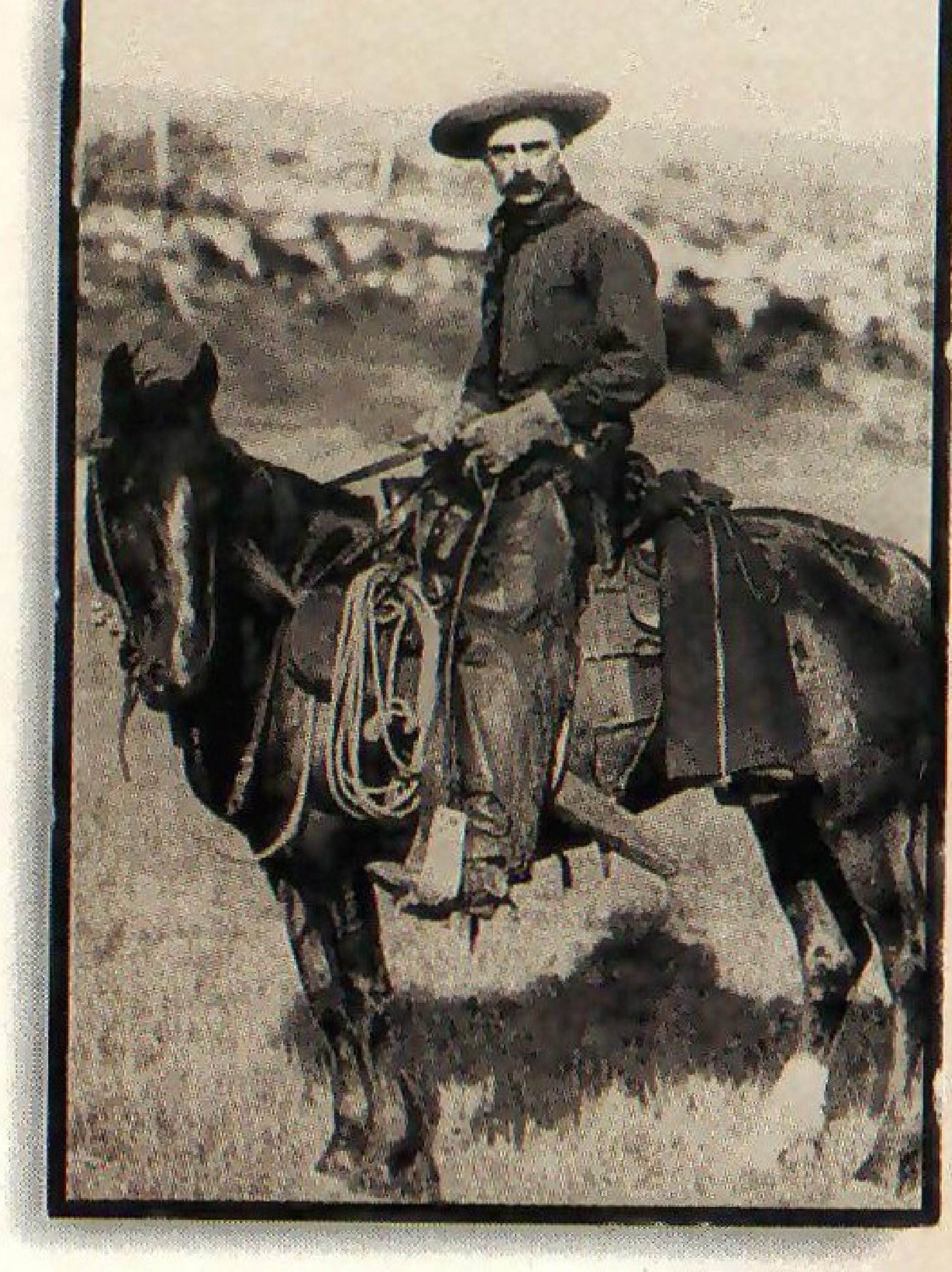
Paxton is constantly developing new products to make supercharged engines more powerful and reliable than ever. One such product is Paxton's new High-Flow Bypass Valve. The purpose of a bypass valve is to relieve the boost pressure that exists in the intake tract when the throttle is closed, or to bleed-off excess boost pressure under cruising conditions. All other bypass valves on the market today do this through a rubber (or other flexible material) diaphragm located in the center of the unit that stretches to allow serious boost pressure to escape. Paxton's High-Flow Bypass Valve utilizes a spring-loaded piston that allows the valve to open 75 percent further than the diaphragm-type, and because there is no rubber to stretch they will last longer. The new valve is compatible with Paxton and all other forced induction systems. For more information, contact **Paxton Products**, 1260 Calles Suerte, Dept. PHR, Camarillo, CA 93012, (805) 987-5555.



Be the first on your block to gain the power and torque advantage for your '96 5.2L or 5.9L Magnum V-8 engine from Mopar Performance's new Camshaft Kit. When combined with Mopar Performance's performance engine controller, air filter element, cat-back exhaust, and exhaust headers, this camshaft kit increases top-end power and mid-range torque substantially. It fits 1996 5.2L and 5.9L V-8 Magnum engines found in Dodge Rams, Dodge Dakotas, and Jeep Grand Cherokees. To obtain the Magnum Performance Camshaft Kit, visit your nearby Chrysler Corporation dealer or authorized Mopar Performance outlet, or contact **Mopar Performance** P.O. Box 360445, Dept. PHR, Strongsville, OH 44136, (810) 853-7290.



Callies Performance Products has announced the availability of ready-to-machine, Chevy 350 and 400-cid, V-8 engine short blocks in two and four-bolt main cap versions. Engine builders will appreciate these blocks, since they are immediately ready to enter the machine shop. Each has been thoroughly cleaned and tested to assure it is in prime condition, and is shipped with cylinder bores that will clean up at 0.030-inch over. Before being crated for shipment, each block is pressure-tested, guaranteeing there are no hidden flaws in the water jackets that might show up after machining has been completed. For more information, contact **Callies Performance Products**, Inc., 110 W. Jones Rd., Dept. PHR, Fostoria, OH 44830, (419) 435-2711.



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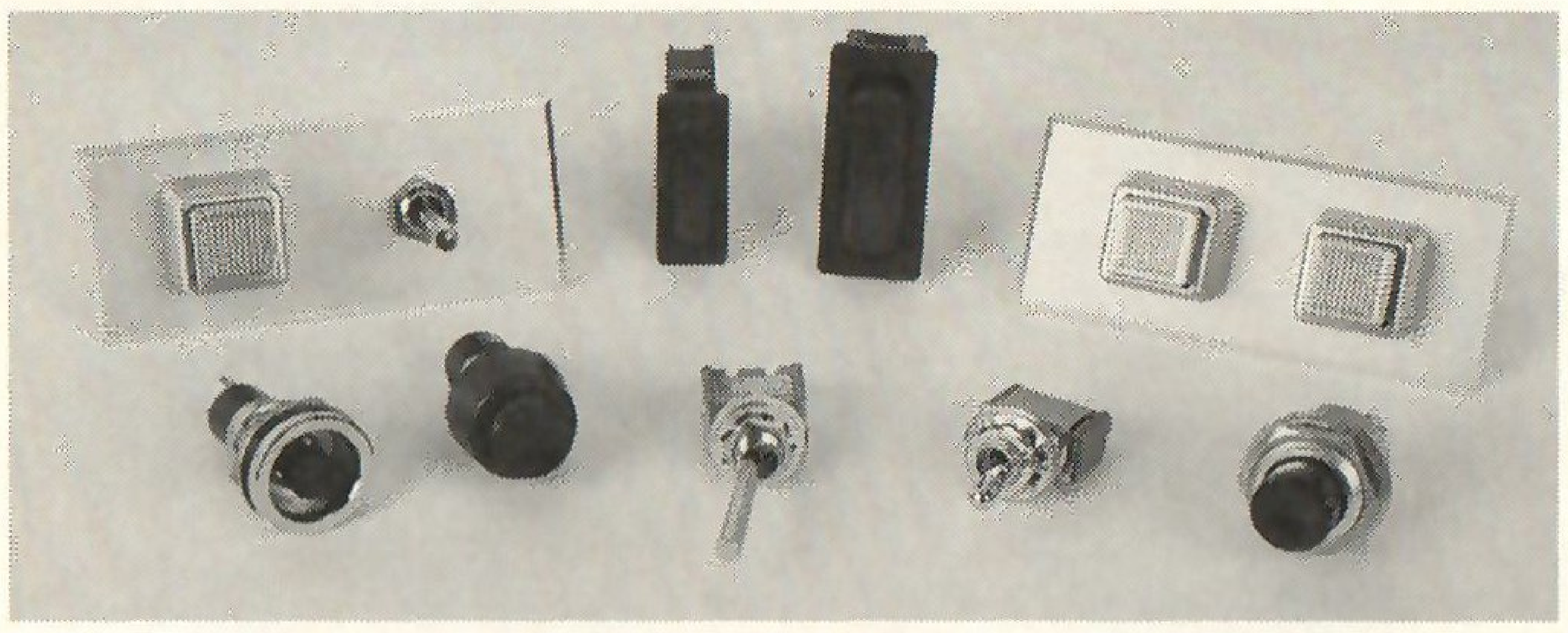
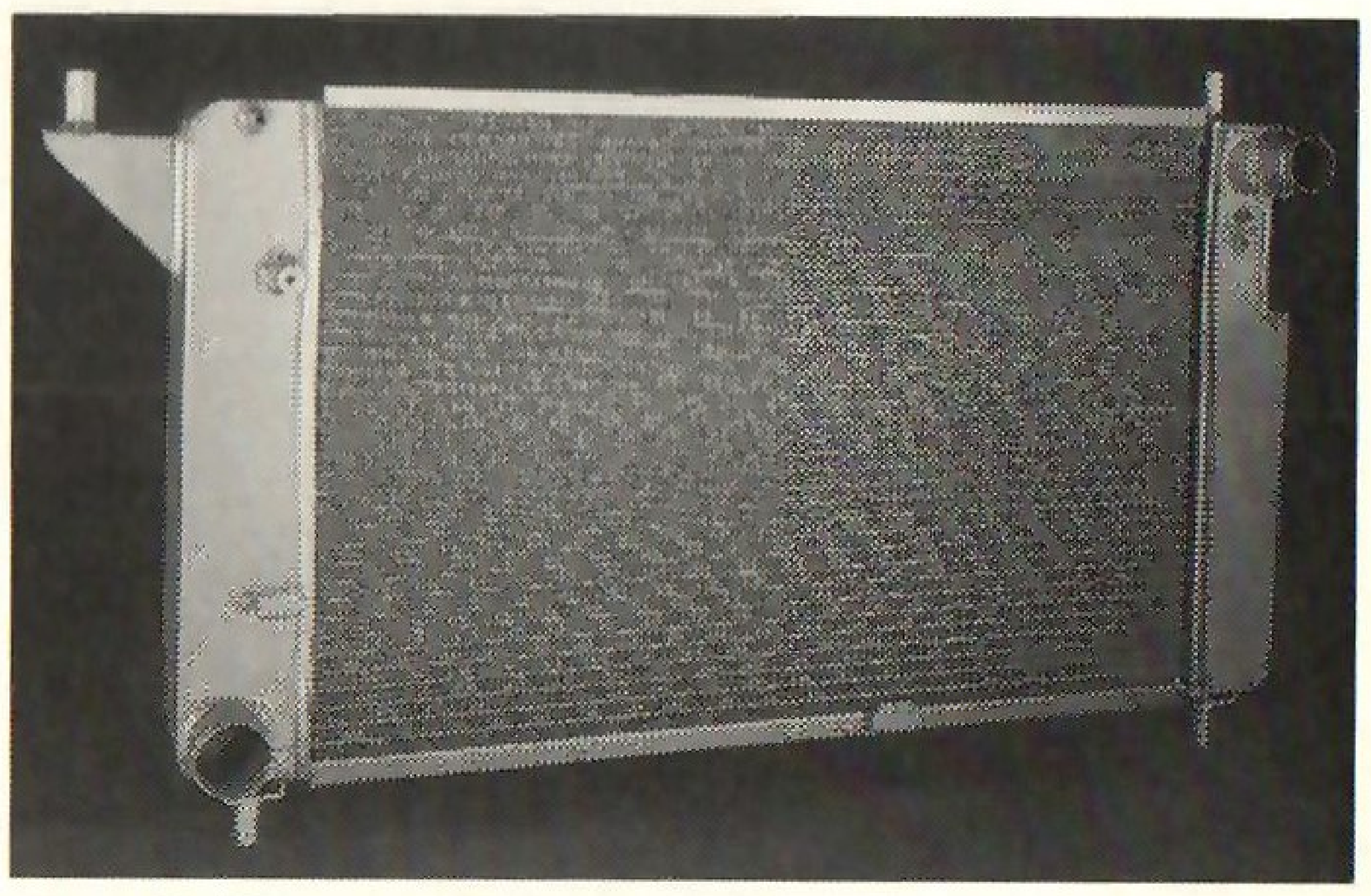
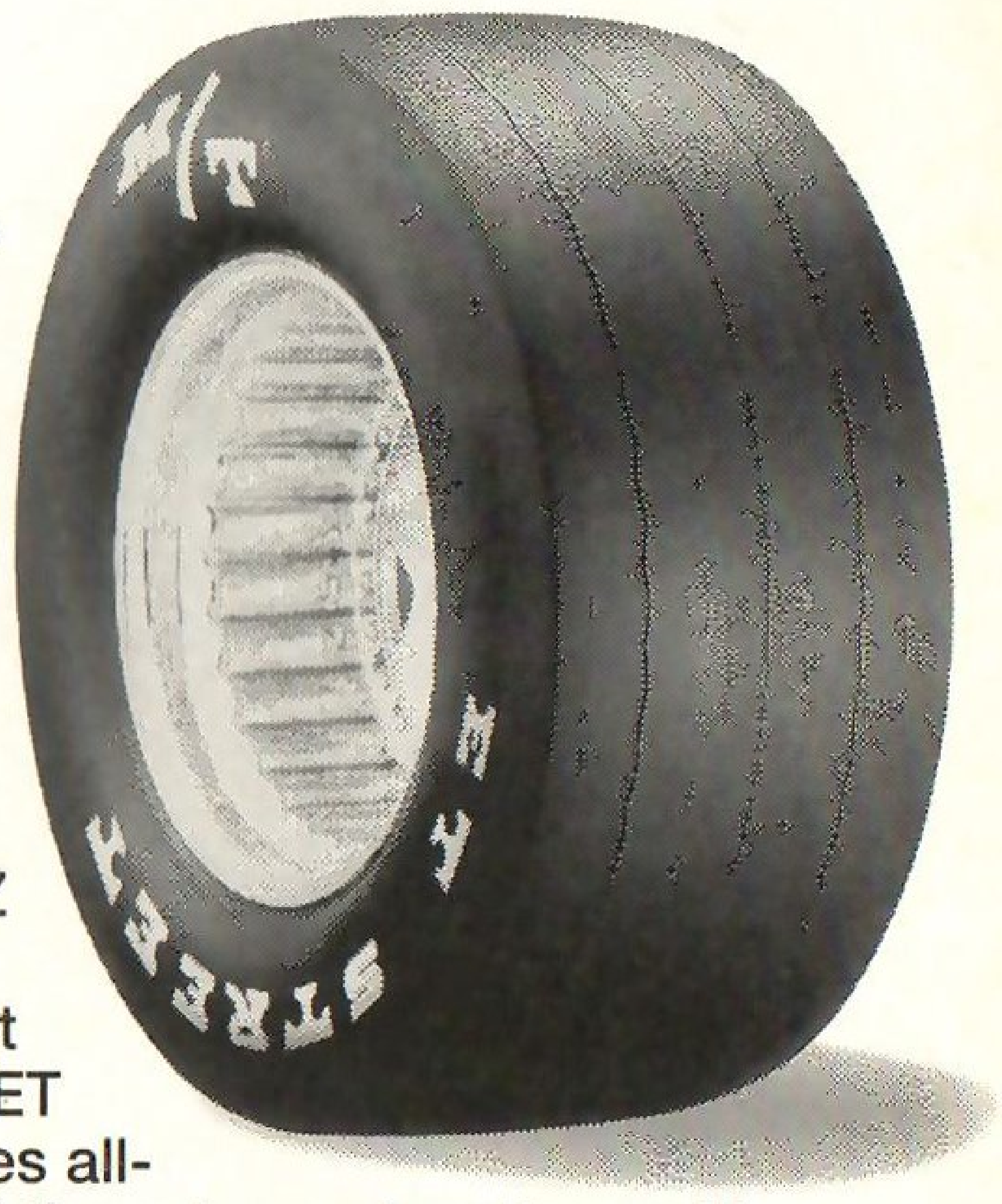


If you're thinking of "switching" something special and want a special-looking switch, StreetWorks can provide. Known for innovation, the company offers a unique line of assorted-style On/Off and Momentary switches. The variety includes small, attractive toggle units, sleek black rocker switches, round and square styles, recessed buttons and keylock switches with removable keys. They're wired for numerous uses, from those as complicated as turn signals to the most simple function. All come with wire leads and, where needed, automotive grade 40 amp relays. For more information, contact **StreetWorks**, P.O. Box 270, Dept. PHR, Bozrah, CT 06334, (860) 859-0513.



The Chill, a new high performance aluminum radiator from Griffin Radiator, features a high-efficient cooling fin that effectively cools the '96 Ford Mustang Cobra OHC. It features a double-tube row configuration with new design tubes and, like all Griffin radiators, is vacuum-braised and double-sealed with special, high-temperature epoxy, which increases tube-to-header strength for improved durability. Griffin also designs and manufactures high-performance radiators for virtually any application, race or street. For more information, contact **Griffin Radiator** at (864) 845-5000.



Mickey Thompson Performance Tires has announced the arrival of its new DOT-race tire, called ET Street. Designed specifically for NMCA EZ Street and Outlaw Street classes, the ET Street features all-new, state-of-the-art construction, with nylon carcass plies and a racing tread compound. This tube-type tire is available in eight sizes, with tread widths from 8.5 to 16 inches, diameters from 26 to 33 inches, and a tread depth of 6/32. Due to the reduced tread depth and special compound, these tires should be used on dry pavement only, and are not suitable for highway use. For more information, contact **Mickey Thompson Performance Tires & Wheels**, 4670 Allen Rd., Dept. PHR, Stow, OH 44224, (330) 928-9092.

The World's Most Powerful Carburetors!

For the last three years NMCA's Pro Street Champions have used Carburetor Shop's leading technology, quality workmanship, and thorough testing to power their way to the front of the pack. This same advanced carburetion technology is available for everything from classic muscle cars to bracket racers to pro classes. Whatever you drive The Carburetor Shop has the perfect carb and fuel system components for you.

Carburetor Shop carbs are designed to give you the clean idle, crisp response, and smooth transitions demanded by real world driving. Quadrajets and Holleys are offered in four stages of performance, with or without chokes, and are individually tested so they work perfectly right out of the box. Buy new or send us your core; 4-barrels built on your core start at just $150. The Carburetor Shop also offers restorations, rebuild kits, rare parts, and plumbing.

Super Blue Fuel Pump

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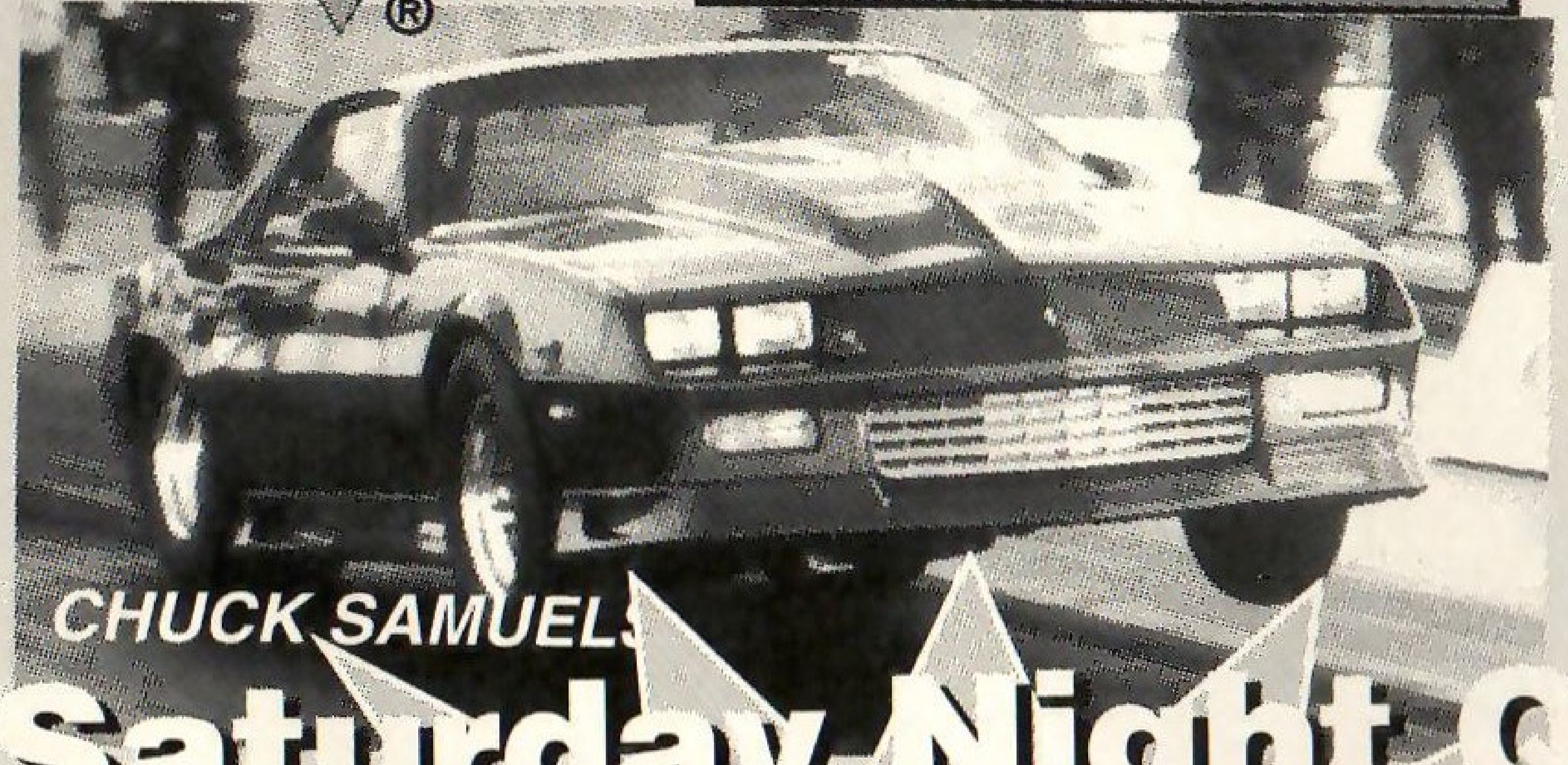

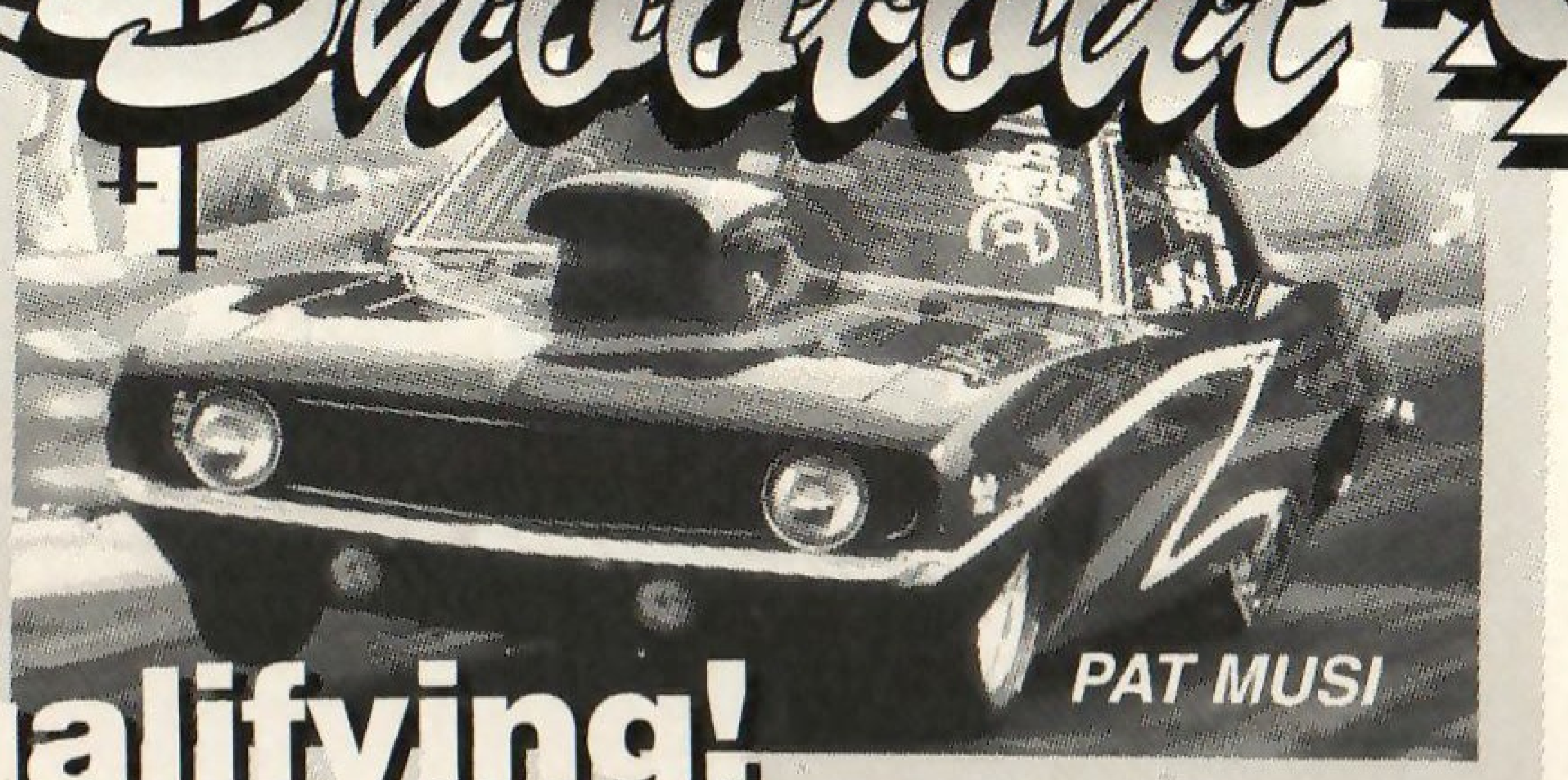

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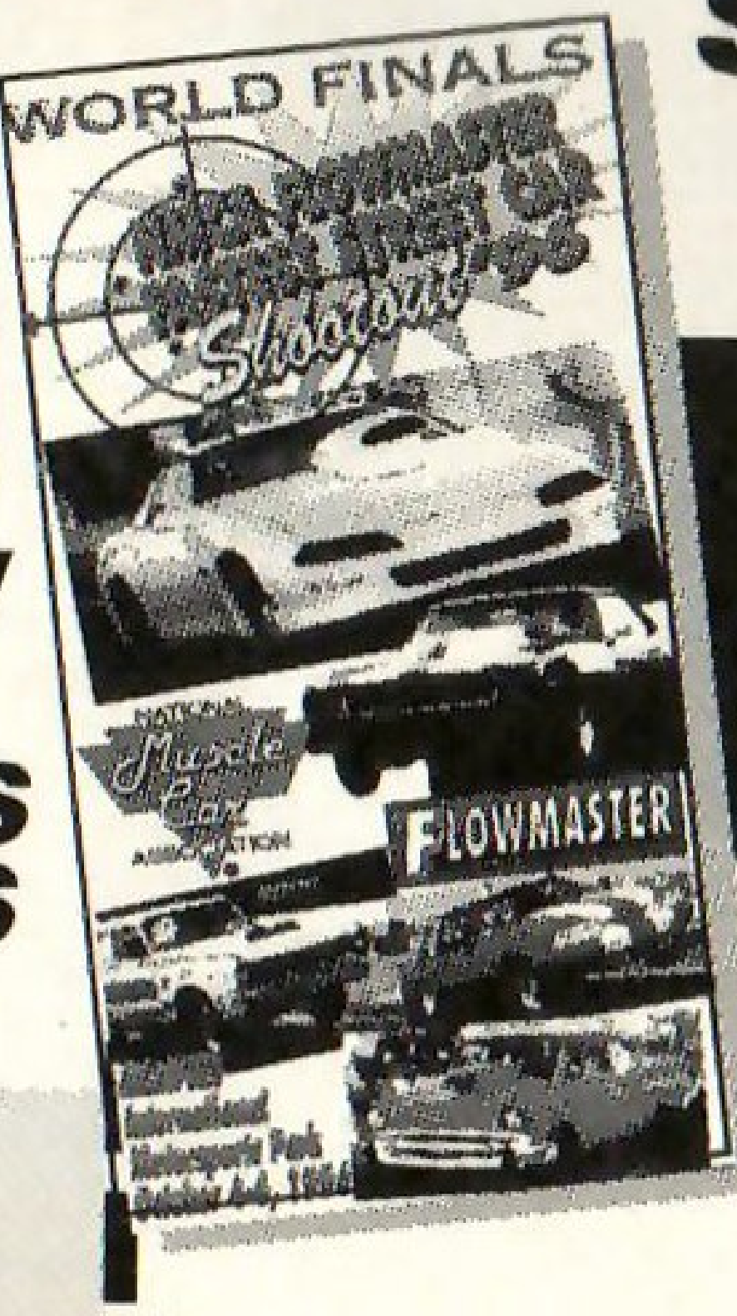

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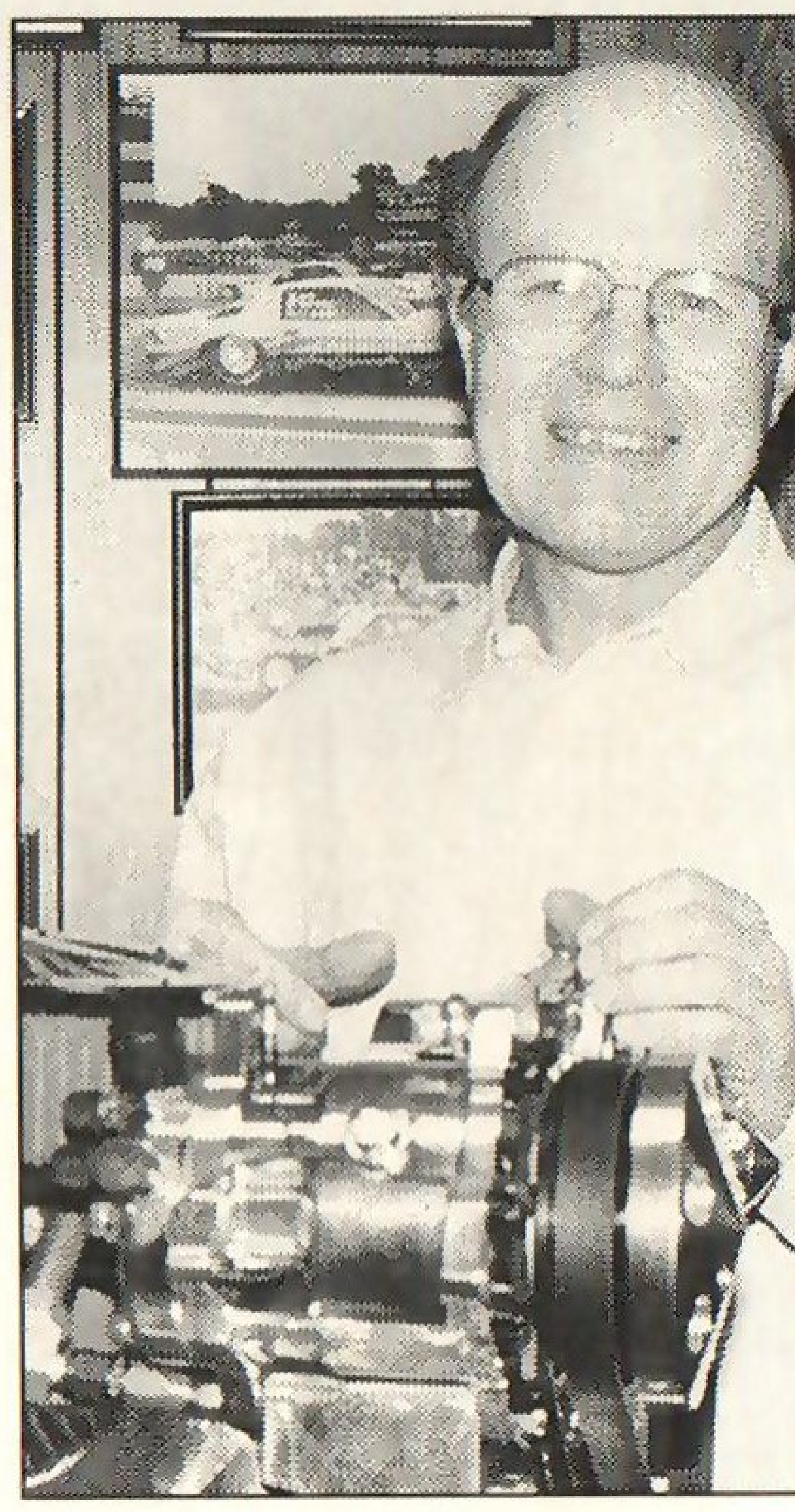
WHEN YOU'RE READY TO GET SERIOUS™

Stroker Power from the Pros

American Speed Builds a 383 with 460 Reliable Horses

BY CAMERON EVANS



We've found that you guys like your horsepower easy and cheap. The old cliché, "There's no substitute for cubic inches" is undisputable, but the cost of chasing that saying can quickly run high. If you had the chance to see the sales figures for speed shops, mail order parts houses, manufacturers, and machine shops, you'd see that the 383 Stroker version of a small-block Chevy is quite possibly the fastest growing (or most solid) segment of the serious performance aftermarket. The torque created by a longer stroke by using affordable and available parts is perfect for the guys on the street. Most likely, that's you!

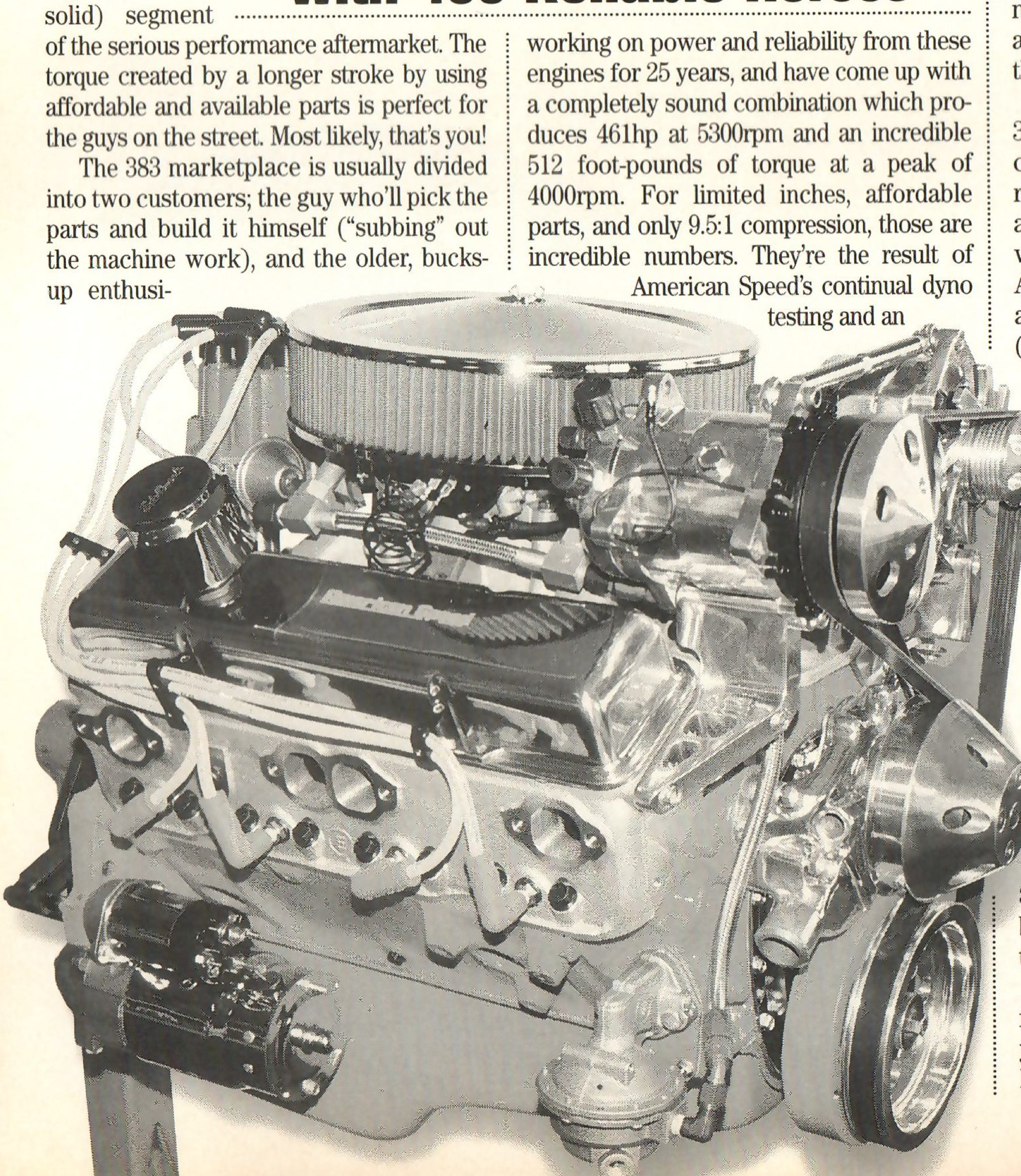
The 383 marketplace is usually divided into two customers; the guy who'll pick the parts and build it himself ("subbing" out the machine work), and the older, bucks-up enthusiast who'll pay someone to build him a complete engine. Gail Trent (right) and the engine-building guys at American Speed Enterprises serve the latter, most likely a street rodder who runs his own business and doesn't have time to build it himself (but he'd like to...).

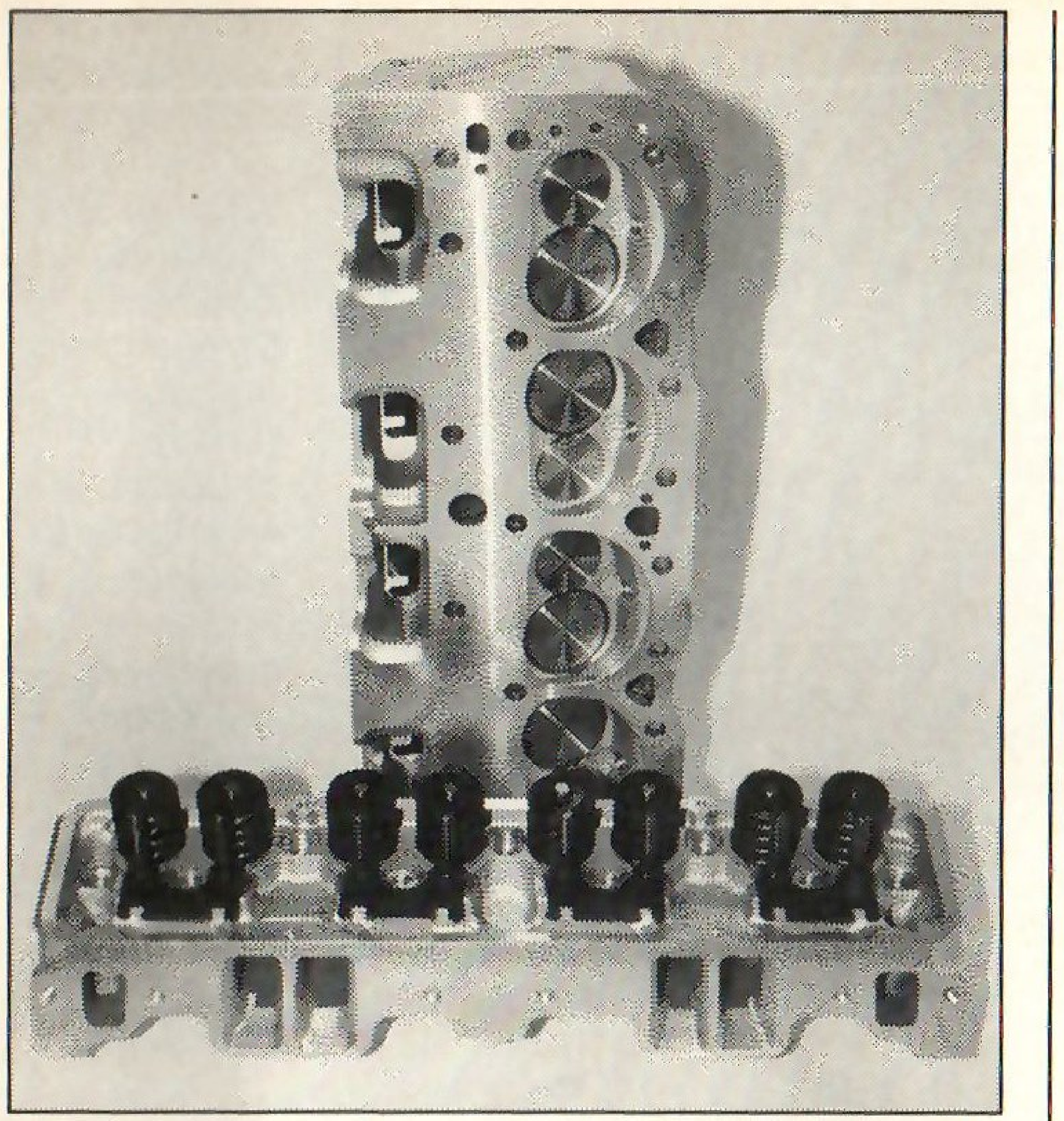
American Speed's success is a perfect example of the 383's popularity — it's their number one selling engine. They've been working on power and reliability from these engines for 25 years, and have come up with a completely sound combination which produces 461hp at 5300rpm and an incredible 512 foot-pounds of torque at a peak of 4000rpm. For limited inches, affordable parts, and only 9.5:1 compression, those are incredible numbers. They're the result of American Speed's continual dyno testing and an effort to sample the latest in aftermarket parts. Until those parts prove to produce the magic mix of power, affordability, and absolute reliability, they don't make it into their customer engines.

There are a few different ways to build a 383, but both require machine work on the cylinder block. One involves a 5.565-inch rod, a typical 4.030 bore, flat-top piston, and a 3-3/4-inch crankshaft (known as a 400) with .200 machined off the main journals. American Speed uses a longer 5.7-inch rod to allow use of TRW's lighter forged piston (L2491), which has a higher pin location. Instead of machining an exisitng crank, they use a specific crank from Elgin which ships with smaller journals.

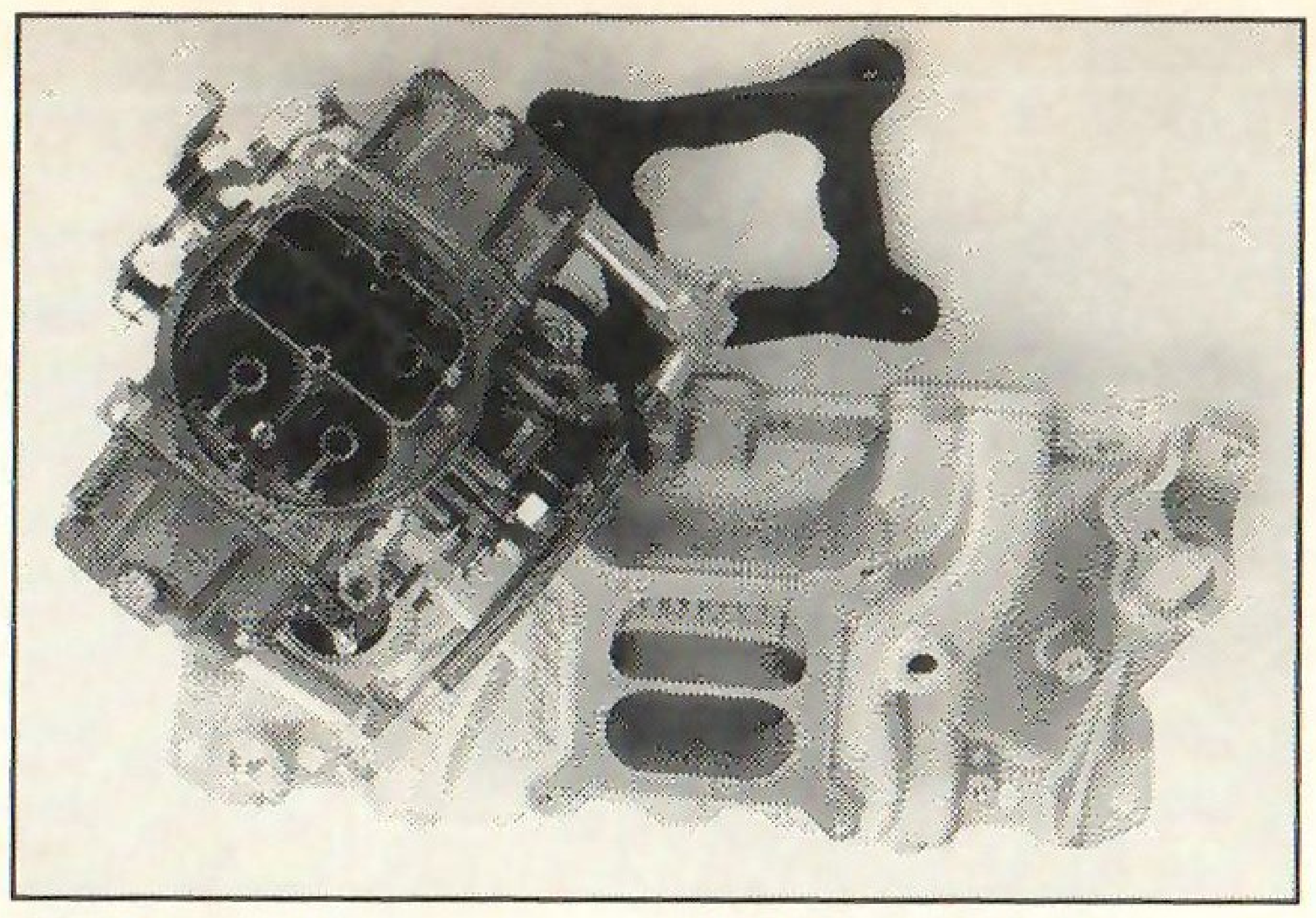
Gail and his machine shop manager/dyno man Willie DeVore (who has multiple wins in IHRA Super Stock competition) let us into their shop for a close look at their detail work and why they pick these particular parts, as we followed the build up of what they call a "Torquer 460." This particular engine was built for an un-named street rod enthusiast who wanted big-time power and road-tour reliability. He wanted all the trick stuff — including Street and Performance's billet pulleys, a polished A/C compressor and such. This pushed his invoice to nearly $6,000, but American Speed sells a long block for $4,695 which performs exactly like this one in the buildup.

Still too much? Gather the parts yourself, find an experienced machine shop, and build your own for about $2,500. We thought you'd like that!

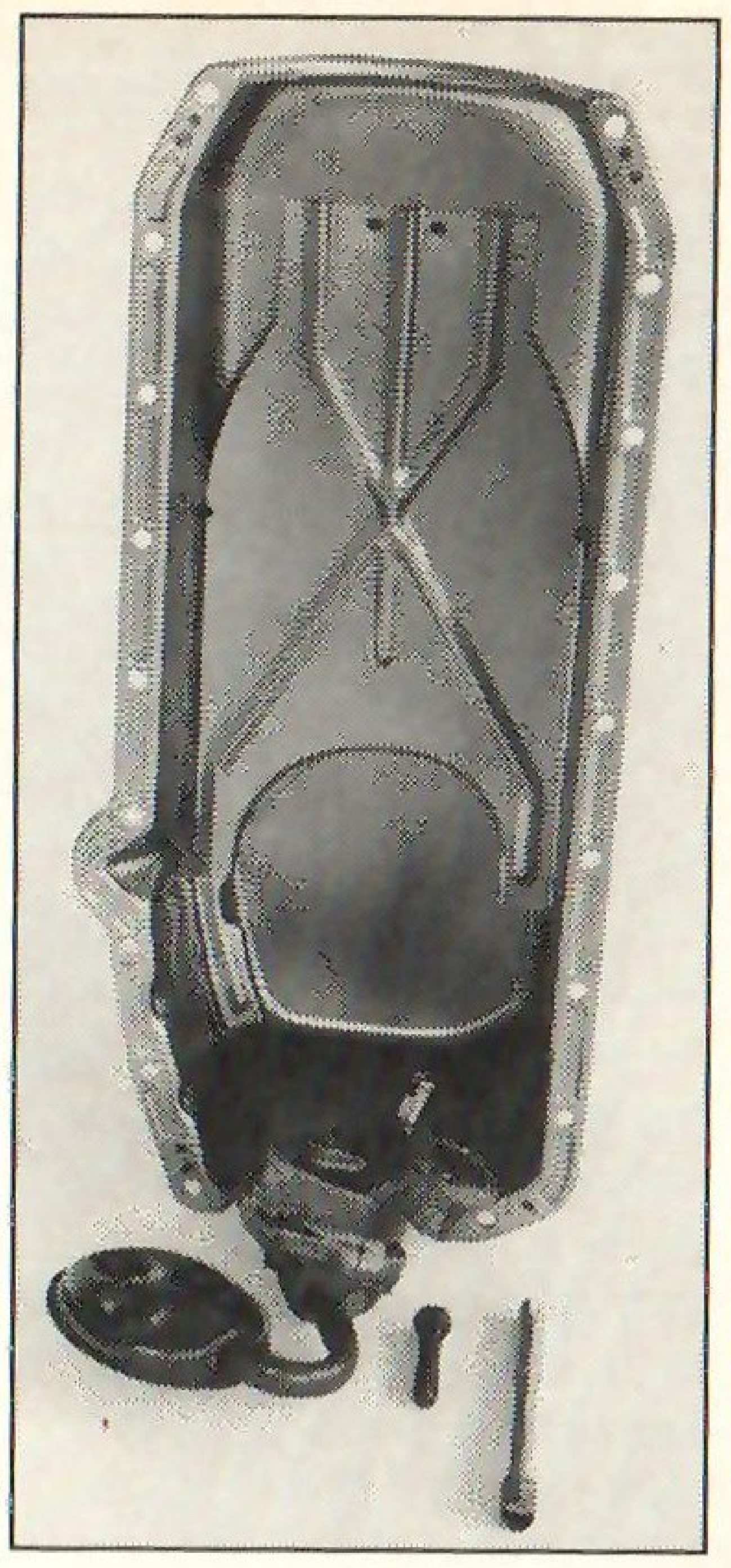




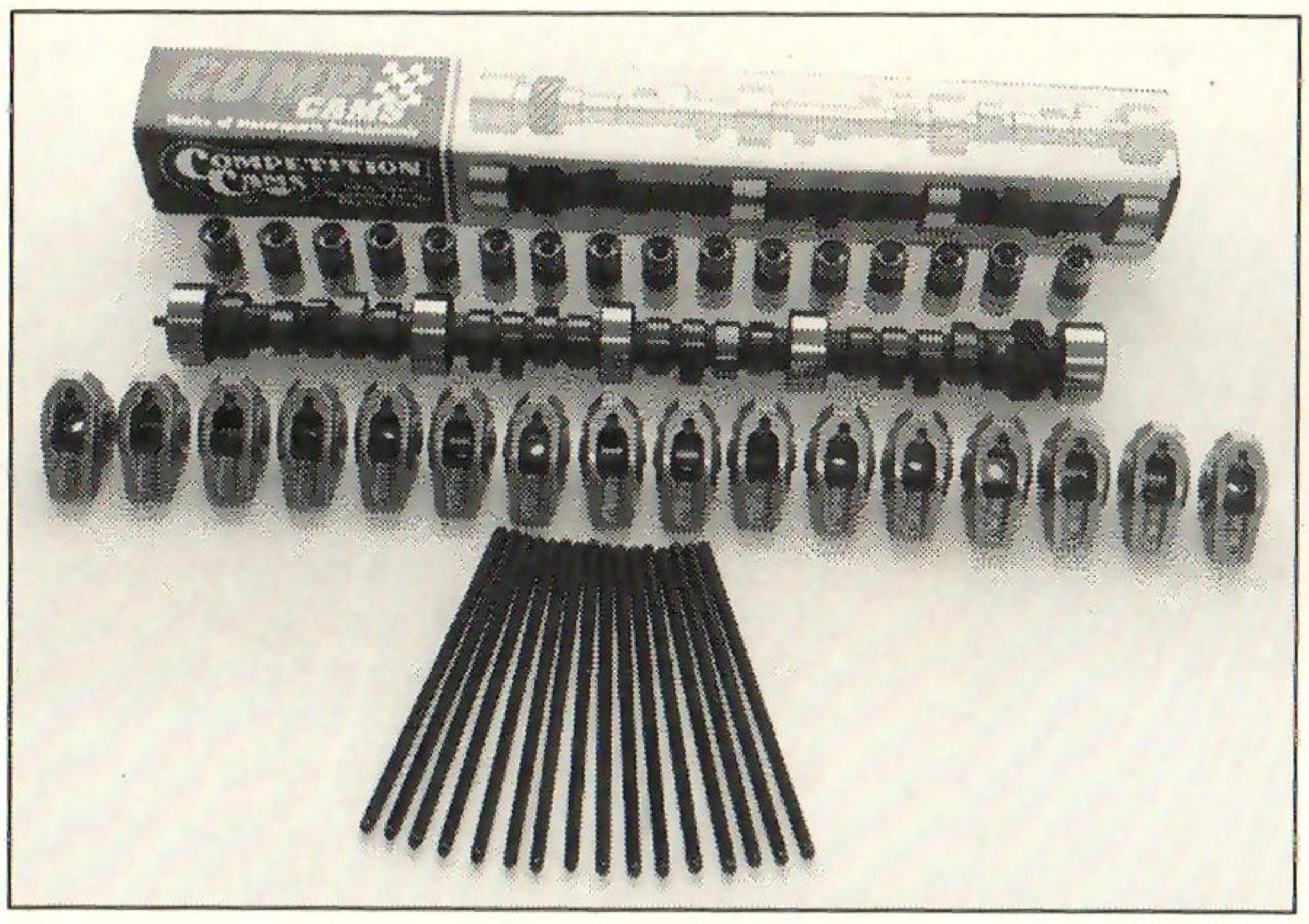
American Speed likes the aluminum Edelbrock RPM cylinder head (#6073) for the high-power stroker engine for the street. Though dyno testing shows this head to top out at 460hp, that's okay, since it's right what they're looking for from an engine of this type, anyway.



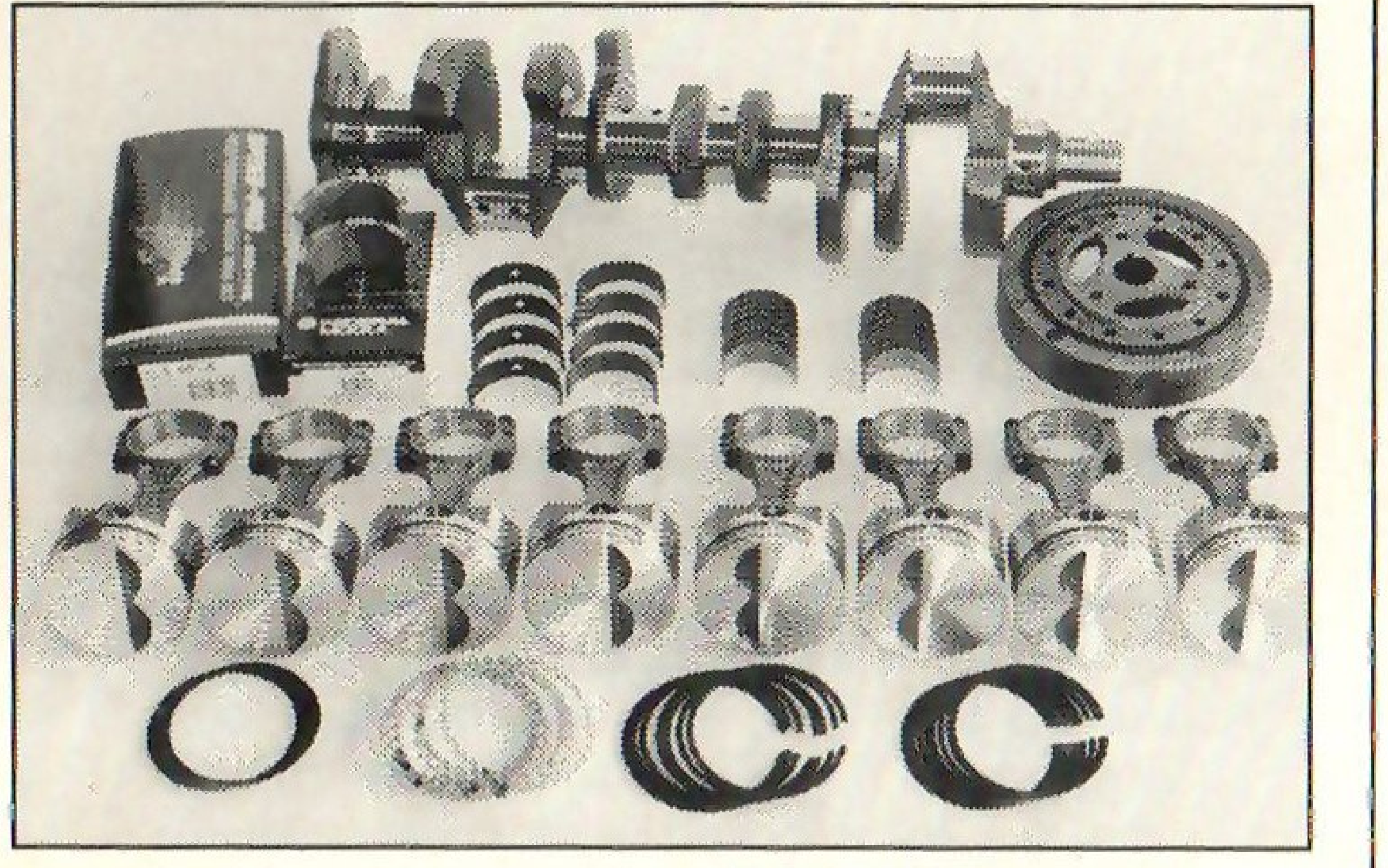
Edelbrock's Performer RPM manifold (#7101) is designed to match the heads in this build up, but American Speed often substitutes the standard-issue Performer (#2101) for those who know they can't find the extra 3/4-inch of hood clearance. A performance drawback? The carb is a typical Holley 750 double-pumper (#0-80779) without smog provisions, but when necessary, they go with Edelbrock's Quadrajet of the same size.



TNT Enterprises supplies American Speed with a six-quart pan which only needs to be notched for #7 and #8 rod clearance. This pan is quite similar to those found on Chevy's LT1 from the early '70s. They blueprint Melling's high volume pump (#EM55-A), as the relief valve has an infrequent history to stick.

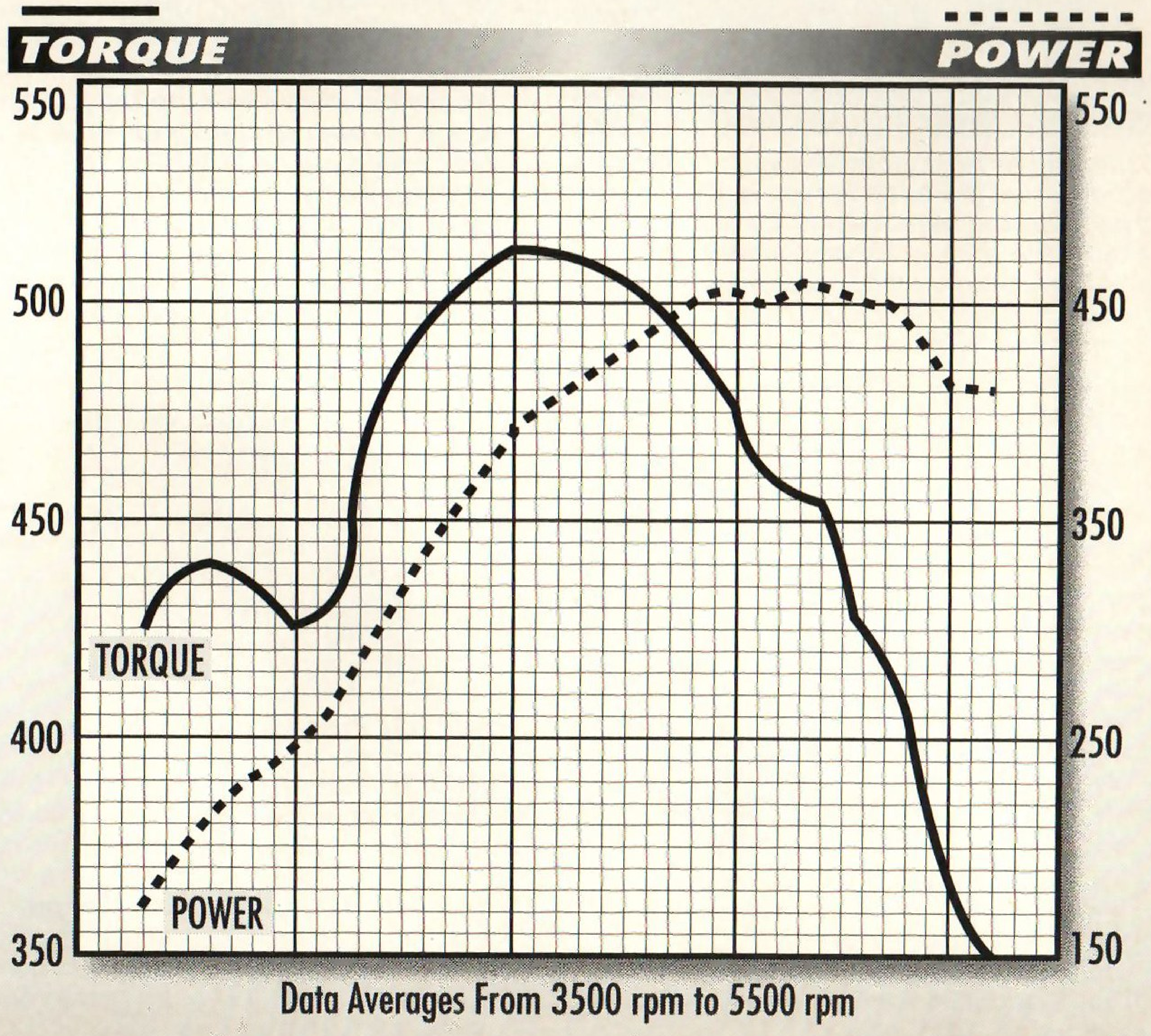


American Speed has tested many cams, but this hydraulic Comp Cams 286 Magnum, installed at 108-degrees, is a dynamic performance street cam capable of these big numbers. With .490-inch lift, 286-degrees advertised duration, and 236 @.050, it's powerful and liveable and should run with Comp's matching lifters (#812-16). Federal-Mogul's hardened pushrods (#RP5000RK) are also in for reliability (we're beginning to sound like a broken record, but breakage is the enemy for a customer engine). Crane's standard performance rockers (#11744-16) are only of the 1.5:1, as this street engine doesn't need to see the revs which 1:6:1 designs would benefit. Not shown are Elgin's "true roller" timing set



For the Torquer 460 kit, Elgin's 383-specific crank (#CS383) is the hot ticket since the journals already have .200 of an inch machined away for the standard-issue, 350 four-bolt main block. A stock GM balancer and narrowed, heavy-duty Federal Mogul main bearings (#139M) work fine at this power range, but you need to step up to Federal Mogul's narrowed, chamfered, and coated rod bearings for racing (#8-71000CH) and TRW's lightweight, forged flat-top piston with the taller pin location with Speed Pro rings (#R8902+030). The rods are standard issue GM hi-po models (5.7-inch) with ARP bolts, but are re-sized, shot-peened, and magnafluxed to look for flaws.

This dyno pull on American Speed's "Torquer 460" involved all the parts in this build-up, and the following variables: 71- and 80-size Holley jets, Amoco 93-octane gasoline, 1-3/4-inch headers, six quarts of 30-Weight Pennzoil, 36 degrees of total timing at 3000rpm (with no vacuum advance), 16 degrees of initial timing at 950rpm, 30 pounds of oil pressure at 1,000rpm, and 13 inches of manifold vacuum at 1,000rpm idle.



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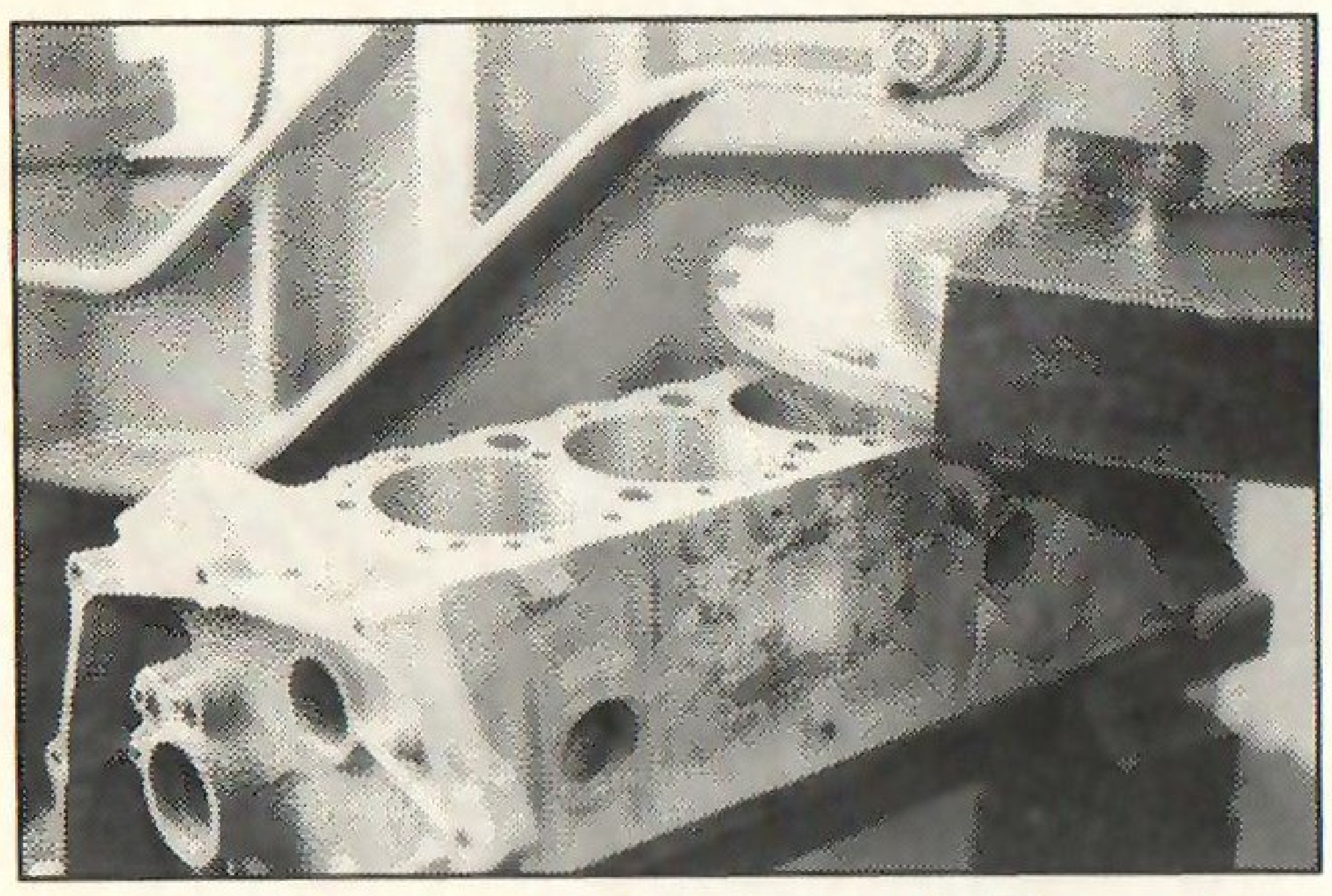
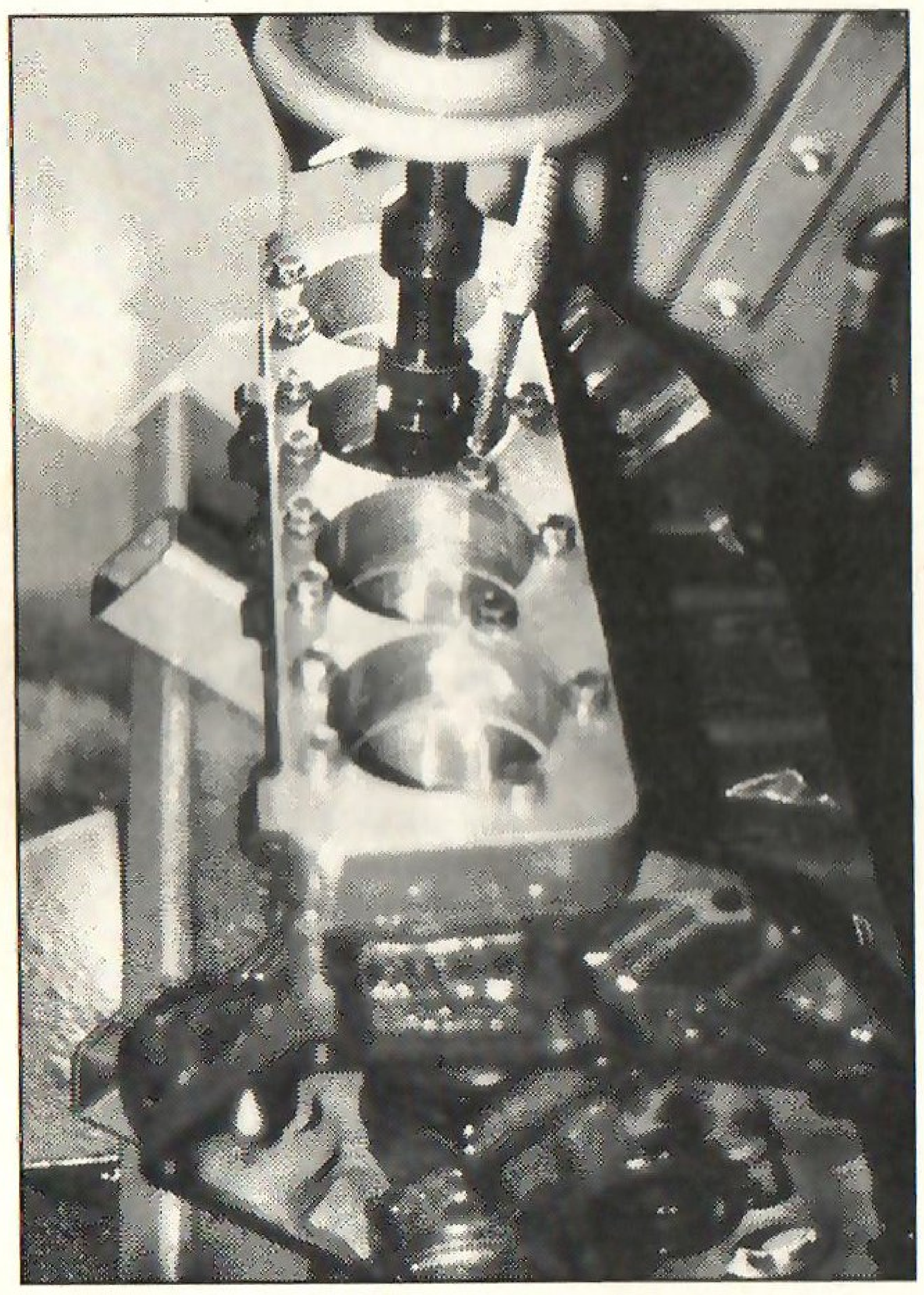
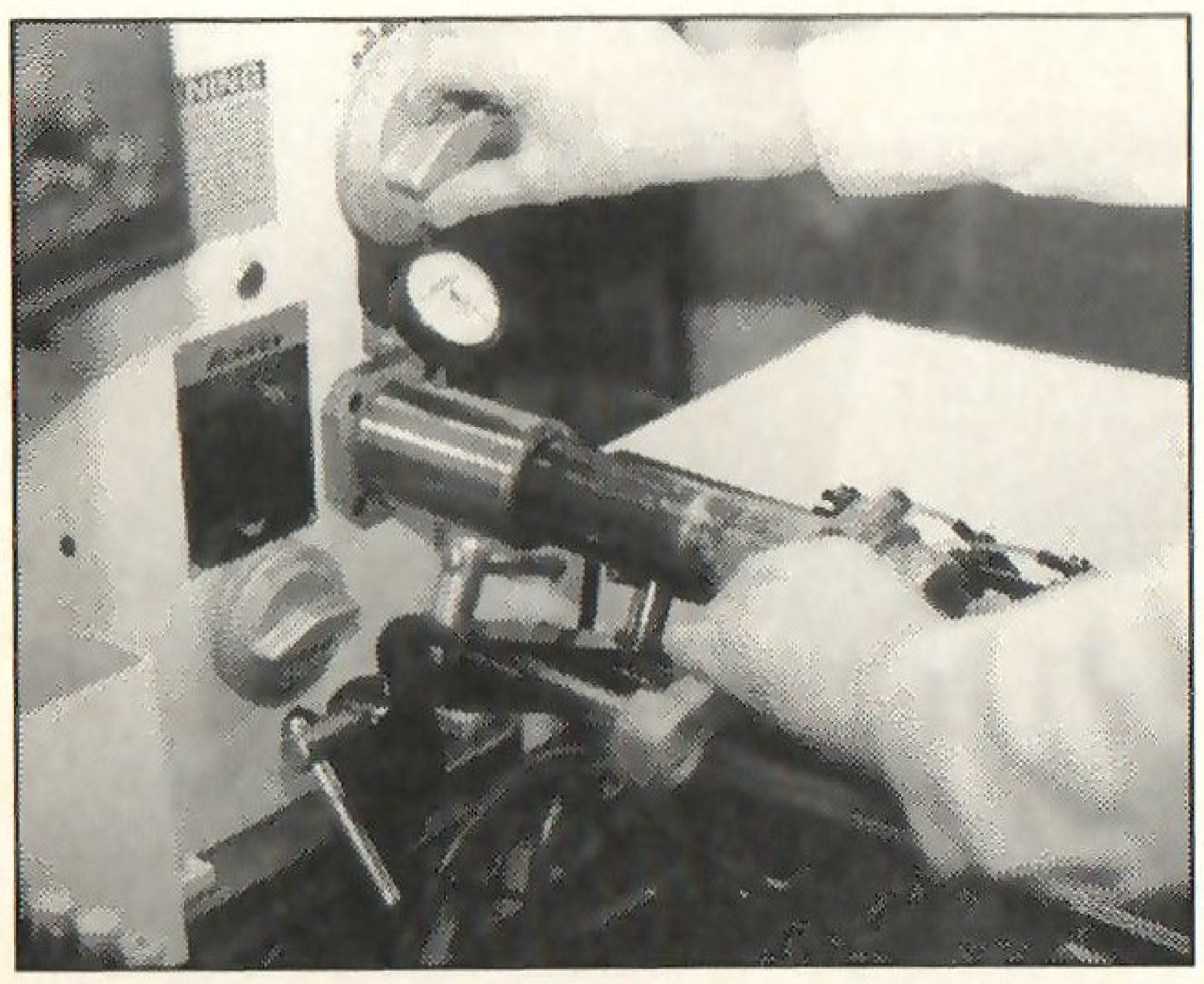


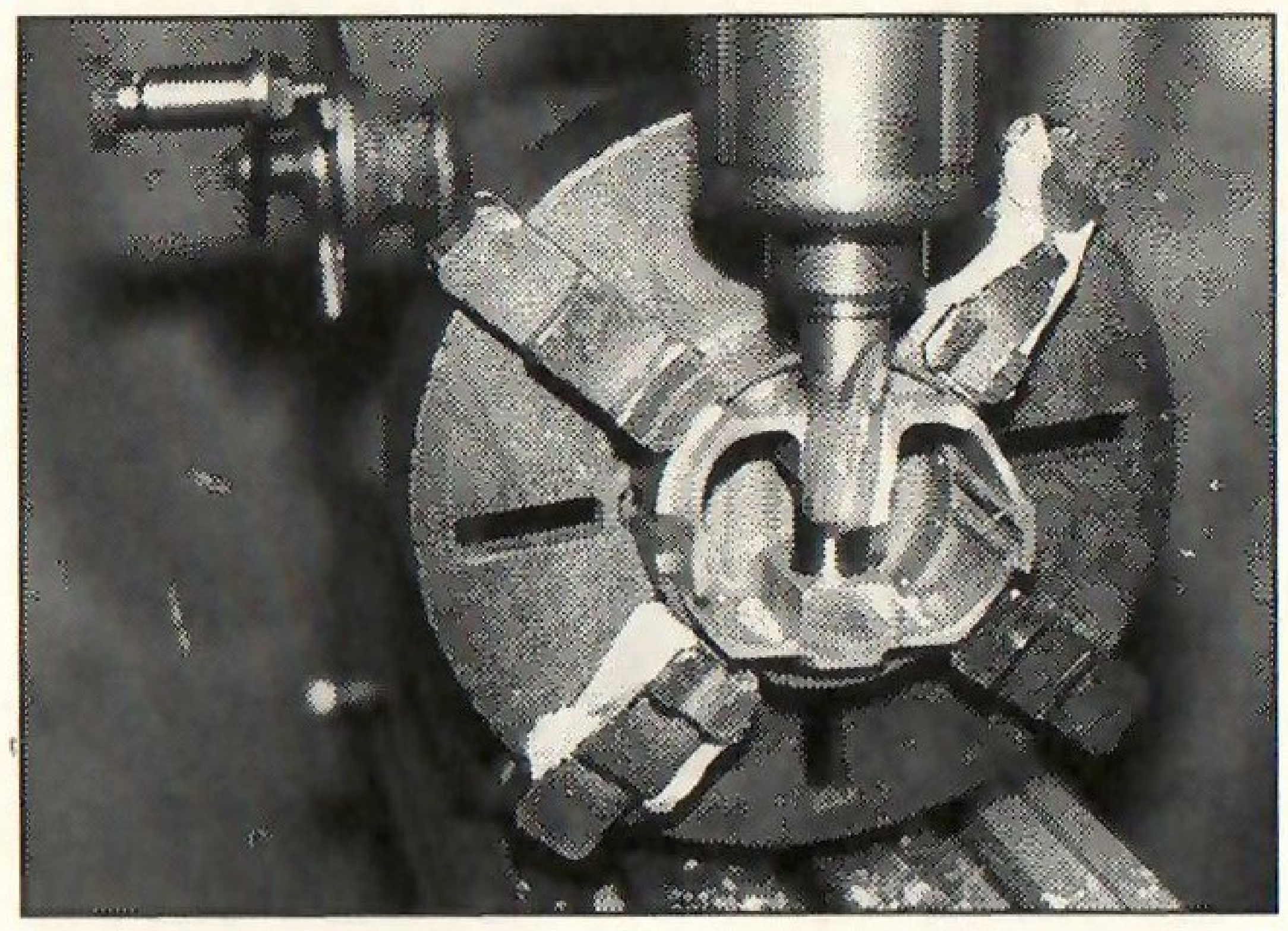
Picking the right block is crucial to a stroker build-up. American Speed hand picks '85-and-earlier examples, dips them in both a caustic tank and an acid tank, magnafluxes each one, then sonic checks the blocks — all to ensure against cranks and core shift (resulting in thin walls which couldn't take a .030 bore). Once selected, a block is decked to .015-inch clearance, which provides .055-inch overall (with a Fel Pro head gasket) for reliability and a true 9.5:1 compression.



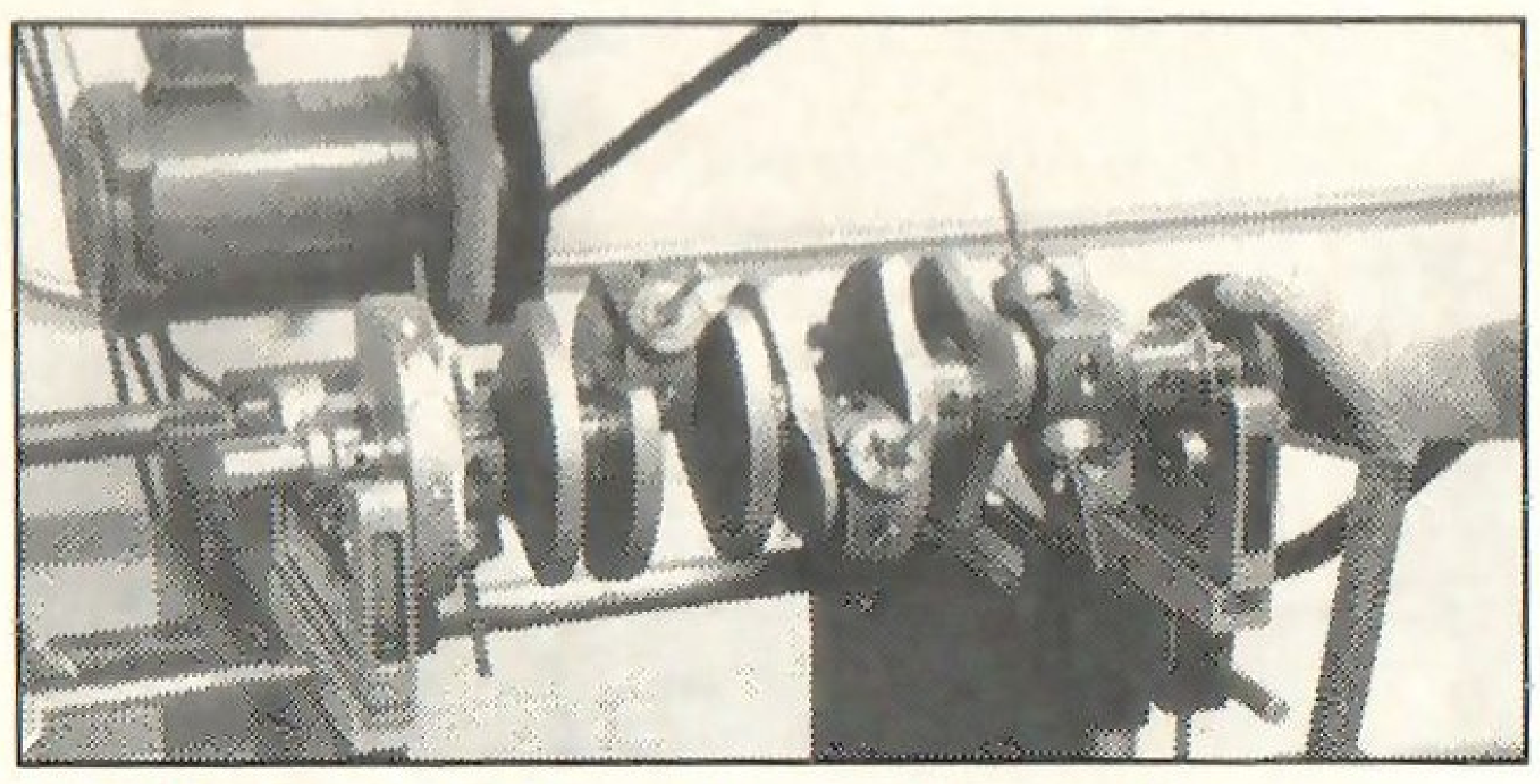
Though we've skipped the align honing process for the main bores, here's where they take the bore from 4.000-inches to 4.030. The deck plate is standard issue machine shop stuff for accuracy, as is the fixture to mount the block, which attaches the main saddles.



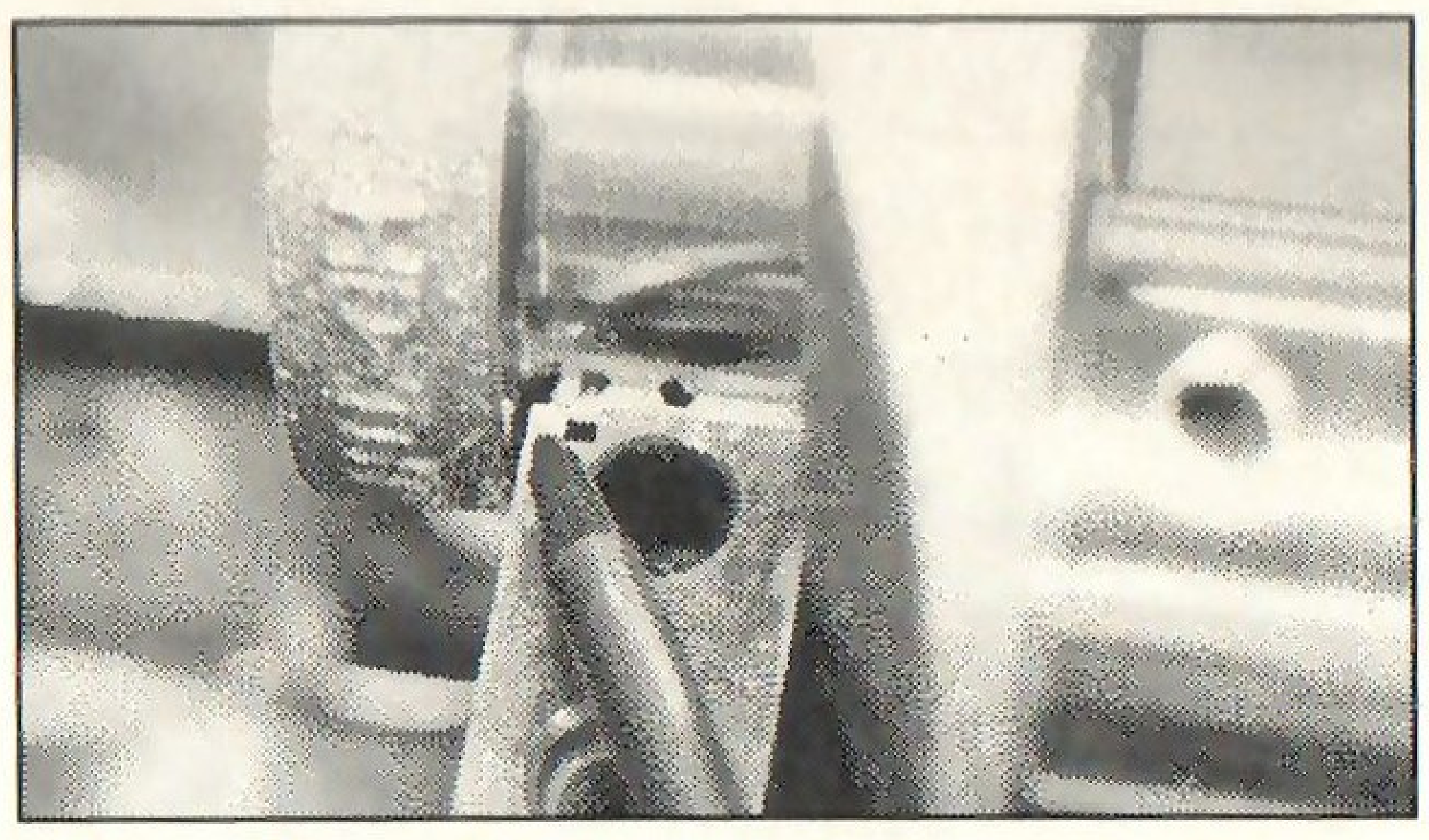
Even new rods can take on an egg-shaped big end when torqued, so American Speed re-sizes each shot-peened and magnafluxed rod to bring it back to round. Though slight, stock GM rods can be out by as much as .0015-inches.



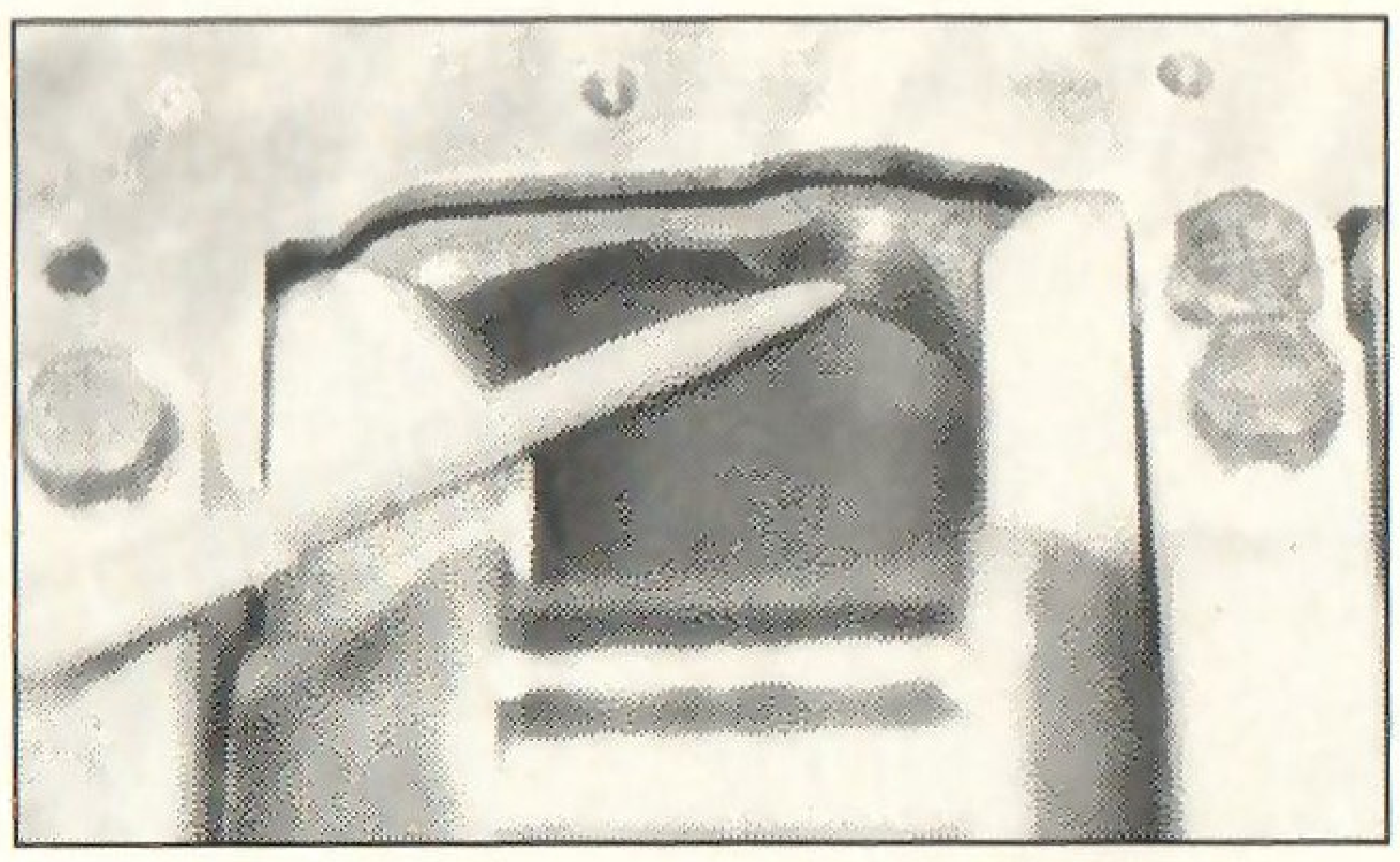
Elgin's cast steel 383 crankshafts have a little bit bigger counterweight than the original 350 crank, and that weight comes very close to the piston at the bottom of its stroke. Therefore, this TRW forged piston's boss must be milled by .080-inches to clear properly.



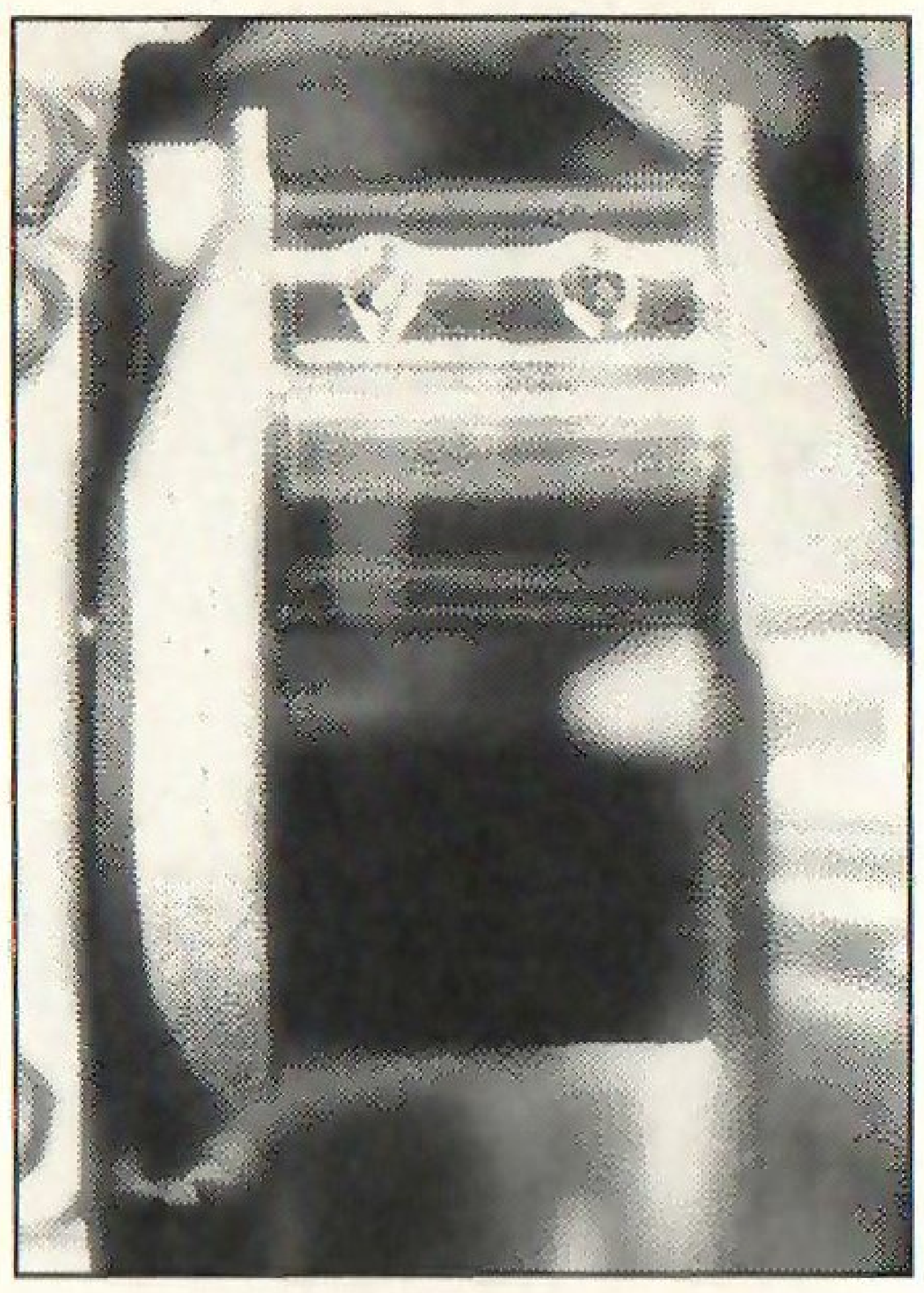
Unlike in its internally-balanced former life, the 383 is externally-balanced. This means the flywheel and balancer follow the crank through the machine shop. Before balancing, these engines are typically 8-10 percent off. When the process is complete, American Speed gets the assembly tuned to within .05 percent.



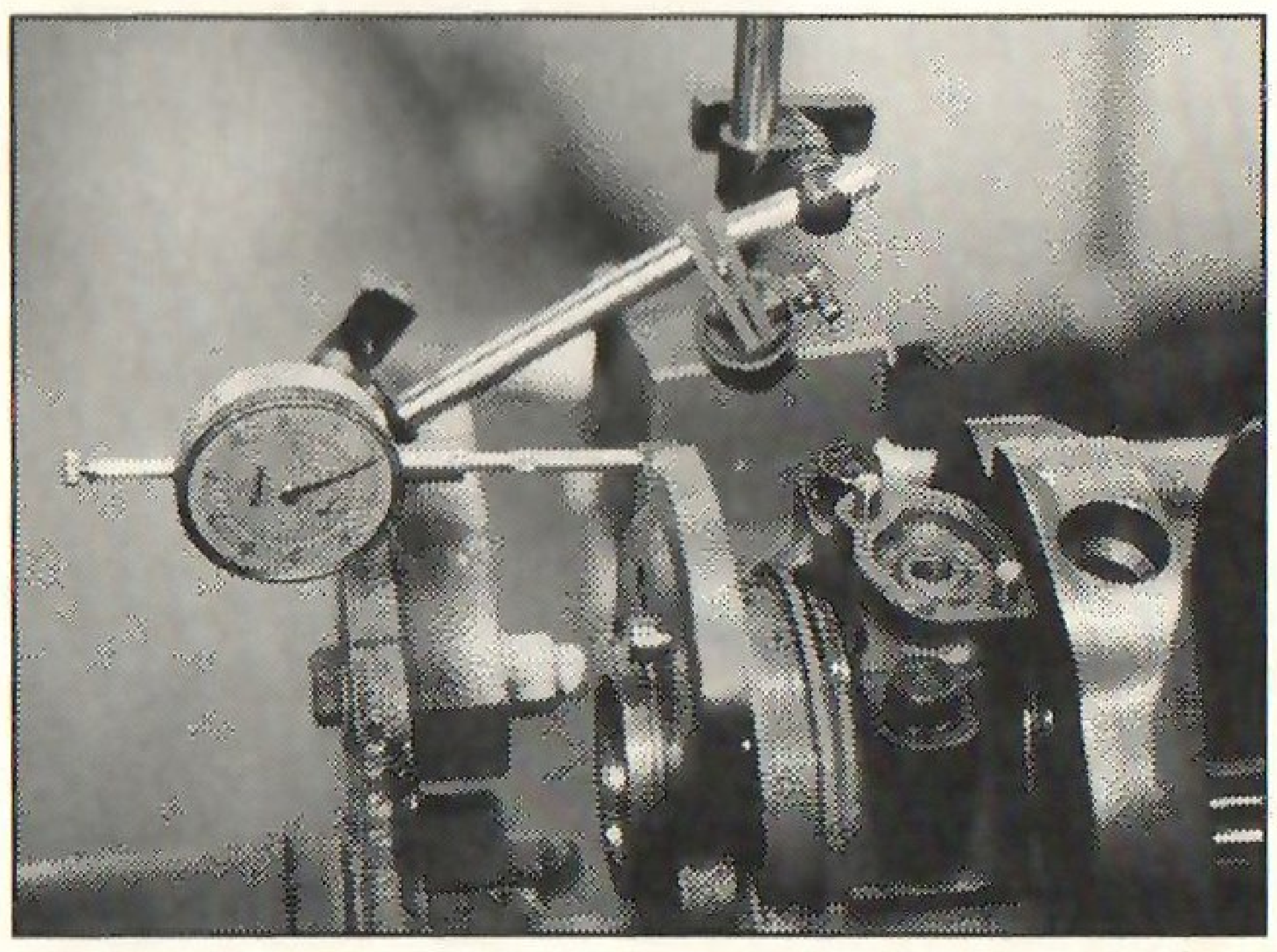
Where the radius leads to the counterweight, a stroker crank journal is larger. That's why you need this narrowed main bearing. Going without would lead to quick bearing failure. It's stuff like this that most don't know which makes using an experience machinist valuable when taking on your own stroker project.



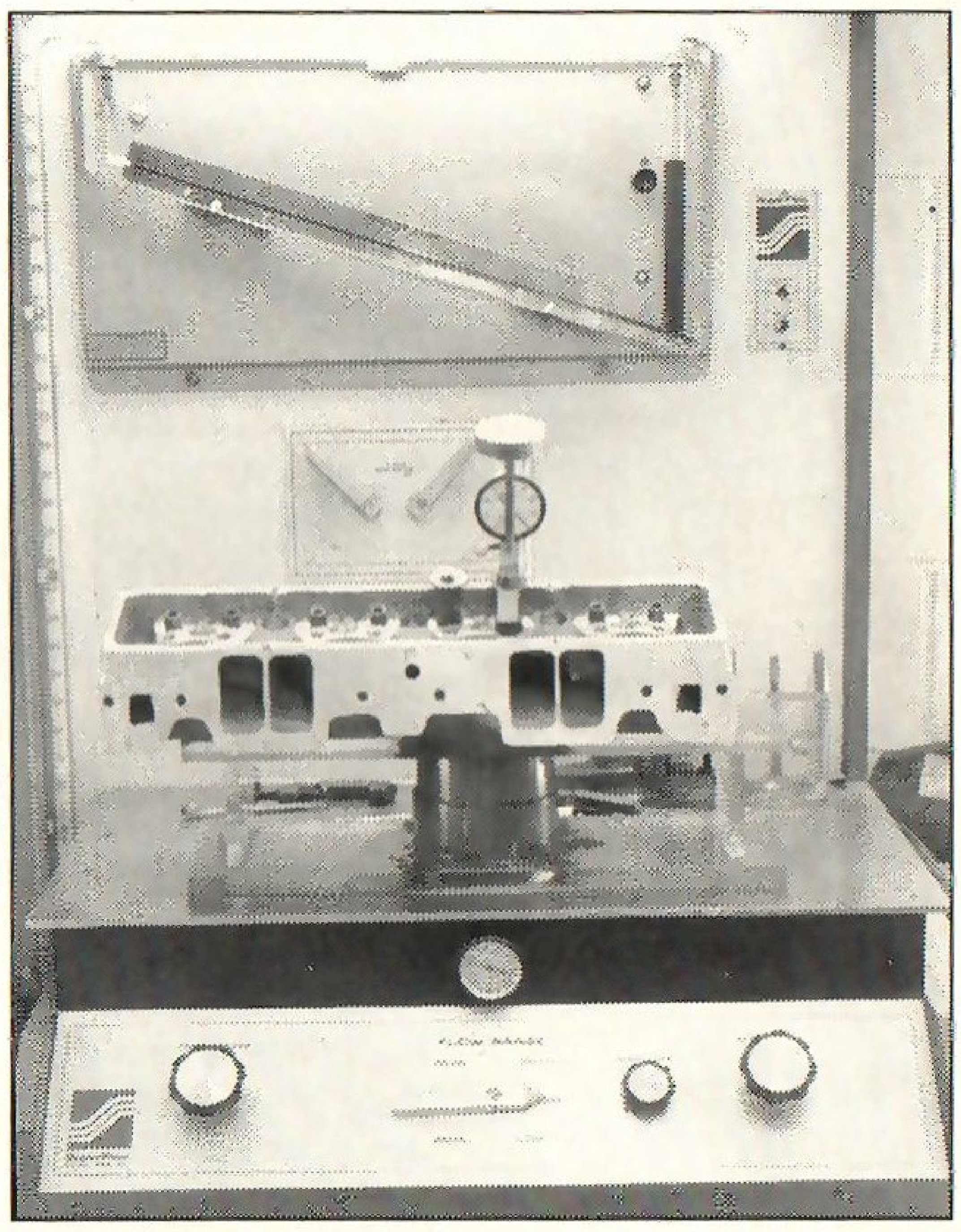
Isn't this the part you we're waiting for? When most people think of machining a block for a stroker arrangement, they likely think of rod clearance. This work should be tried by someone who's done it before, as it's easy to go too far and ruin the block. American Speed can get the process done in 30 minutes, others could take up to an hour. Anymore time would mean your machinist is gouging you or doesn't know what he's doing.



Though not required, American Speed feels it's important to chamfer the crankshaft's oil holes for increased volume to the bearings. This is a small change and won't adversely effect oil pressure, especially with the good Melling pump.



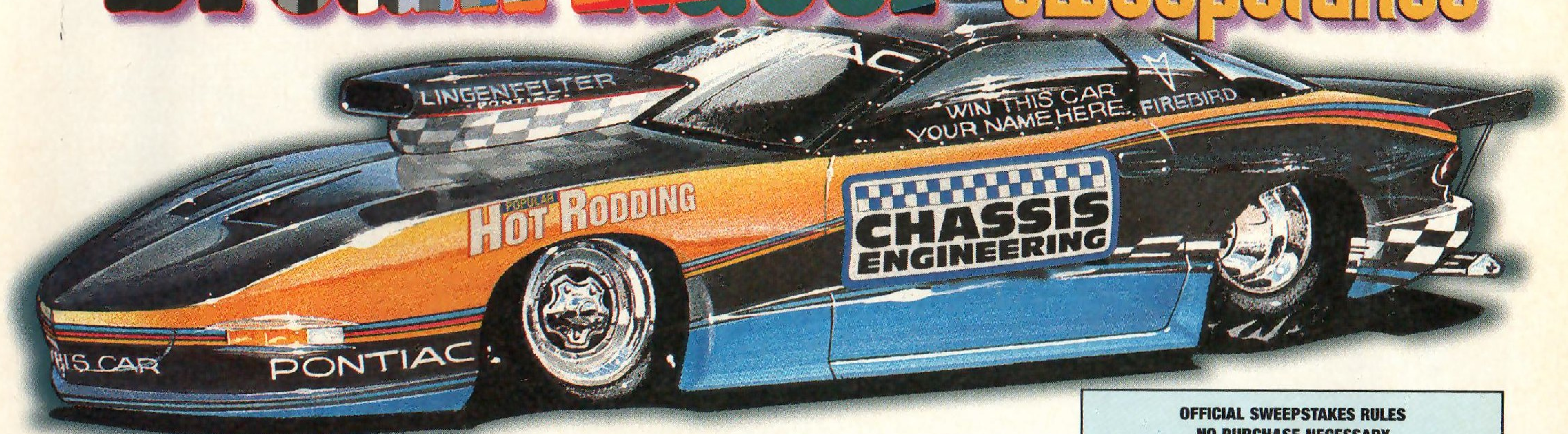
There are no tricks when it comes to crankshaft end play on the 383. American Speed likes to see between .003 and .006 inches of clearance. By the way, too much play will allow the crank to slop around, causing annoying clatter and weird clutch adjustment with a manual transmission application. Too little would make obvious heat and ruin the main bearings much quicker.



According to Trent, if you want to hog out the 176cc runners, you should be looking for a bigger cylinder head in the first place. Tons of flow bench testing and dyno work show that all these Edelbrock RPM heads need is a little bowl work and a three-angle valve job, as their small, refined runners already produce the low speed velocity required for low revving torque. Isn't that what you're looking for in a street motor?

(Continued on page 28)

The Chassis Engineering / Popular Hot Rodding Dream Racer Sweepstakes



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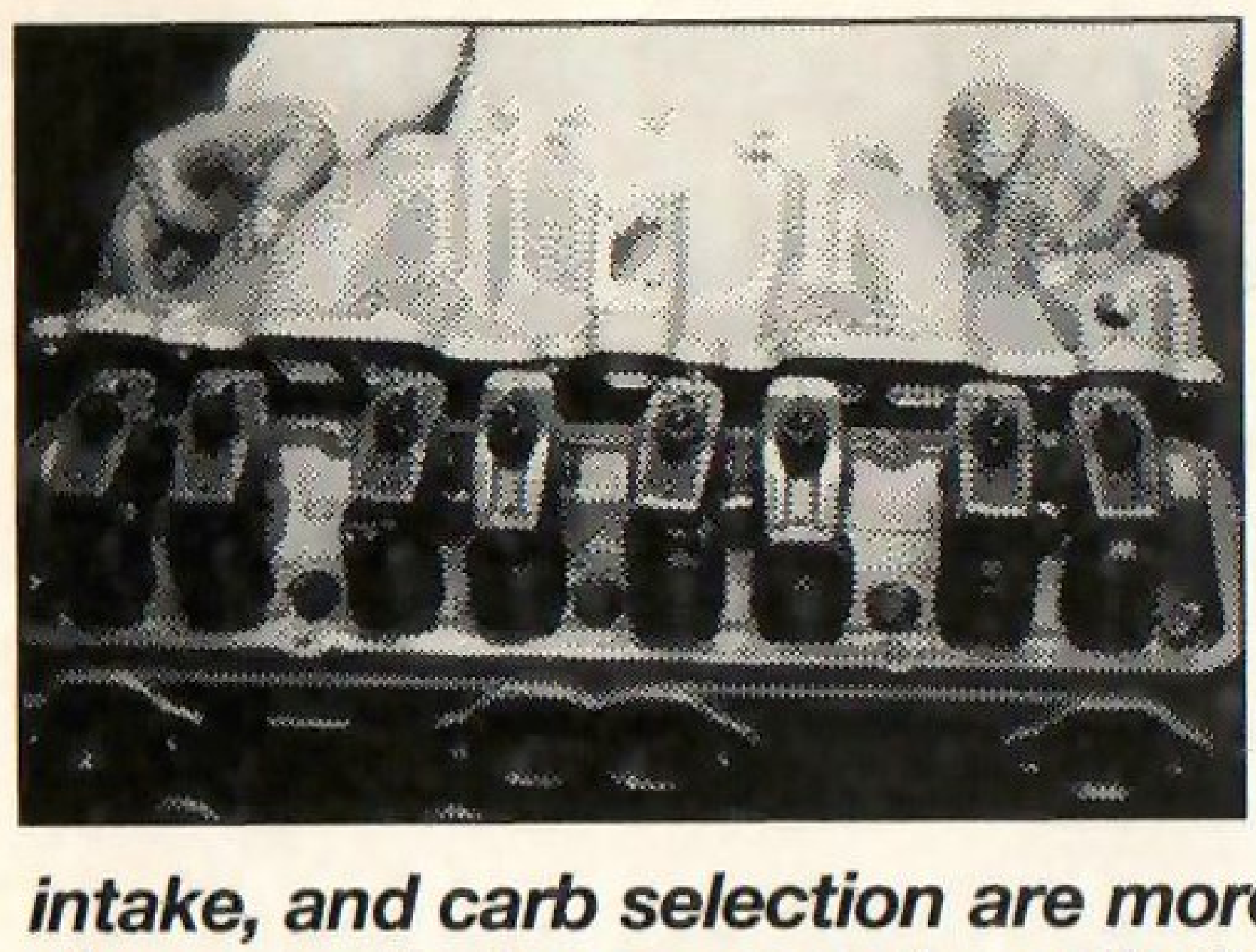
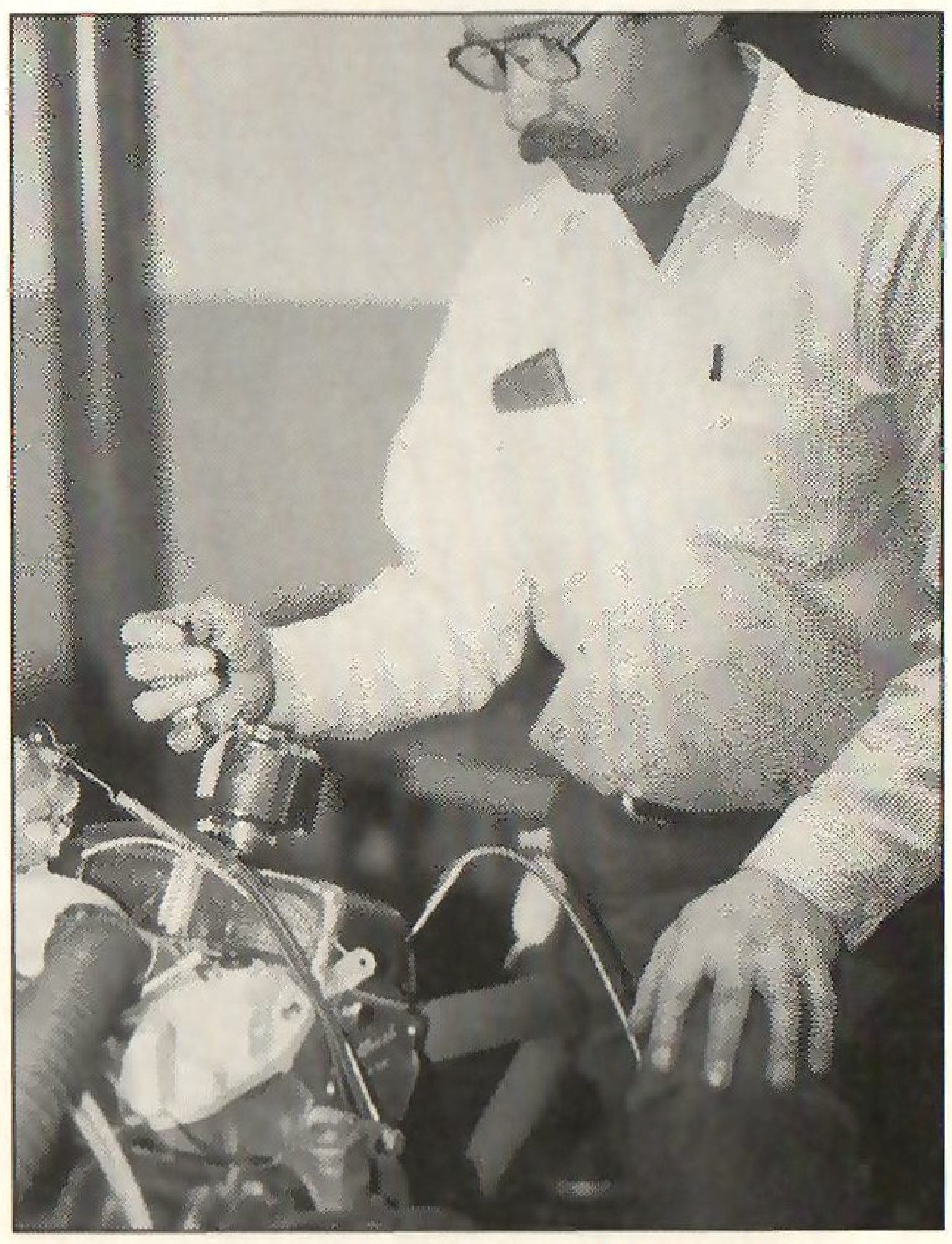
STROKER POWER FROM THE PROS

(Continued from page 26)



Crane's 1.5:1 rockers work fine with American Speed's 460hp combo, as it's not designed around high rpm. The 1.460-inch springs which ship directly from Edelbrock don't give you any trouble. Cam, intake, and carb selection are more logical and inexpensive ways to tune around a cylinder head. American Speed works hard to pick the right parts, and they say the Performer RPM fits the bill. It's worth about 8 horses more than its standard Performer cousin over 5500 revs. If you ordered one of their engines, you've got your pick.

Through constant development, American Speed has learned ignition is very important to the performance package. They choose an MSD billet distributor (#8360), but re-curve its advance to come in completely by 2200rpm. A stock HEI unit produces total advance at 4500 revs, which would be too lazy for a torque monster like this. As for total advance, these engines ship with 34-degrees of total advance — a standard 350 engine likes more timing and the 400 likes less.



Drag racer and engine builder Willie DeVore runs every one of American Speed's customer engines on the dyno to provide the owner with a power printout and some piece of mind. As a final check, Willie reads an ACCEL #416 plug, which he says is about two notches down from their hottest plug. These guys don't cut any corners, providing an excellent engine that you can bet won't give you problems down the road.

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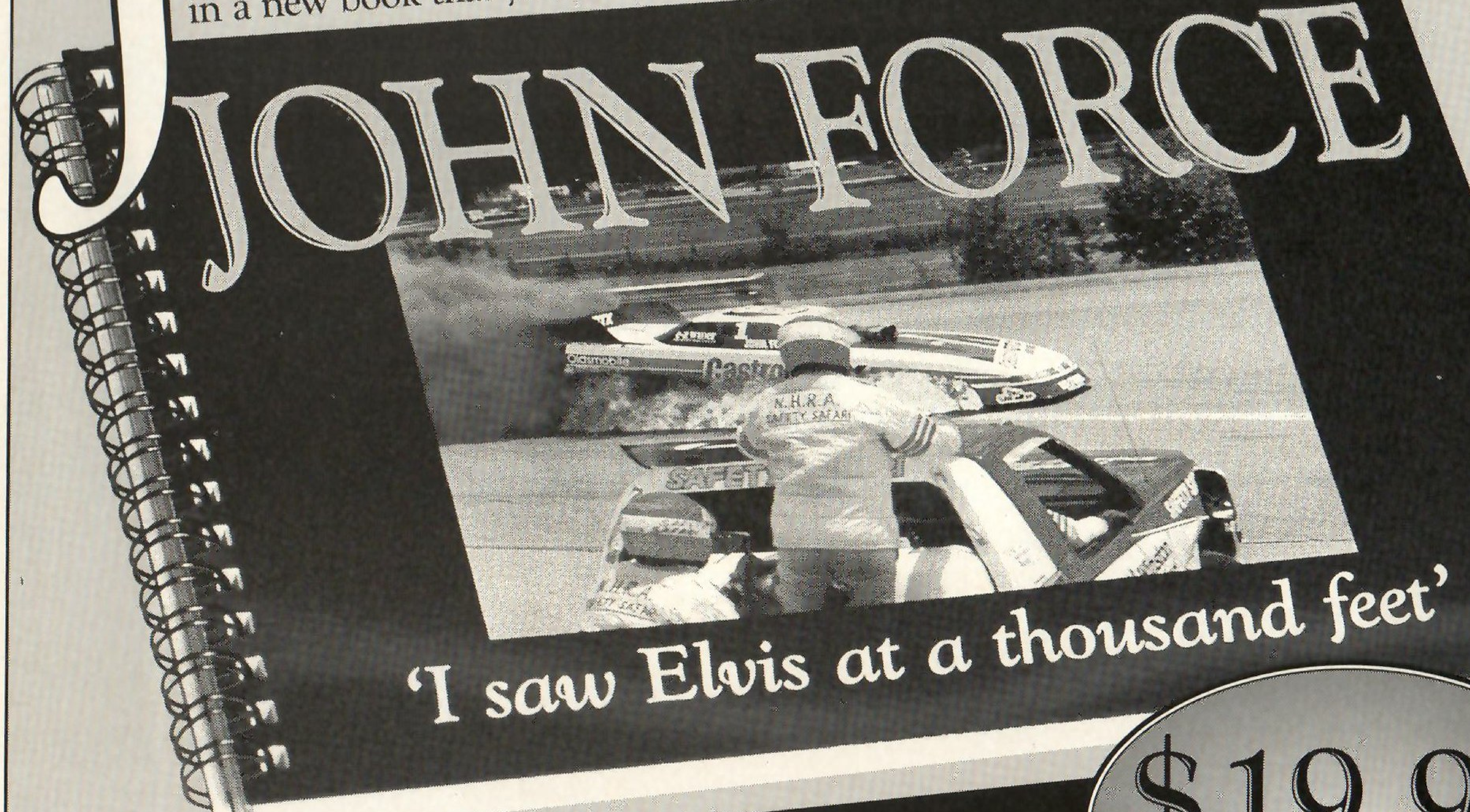

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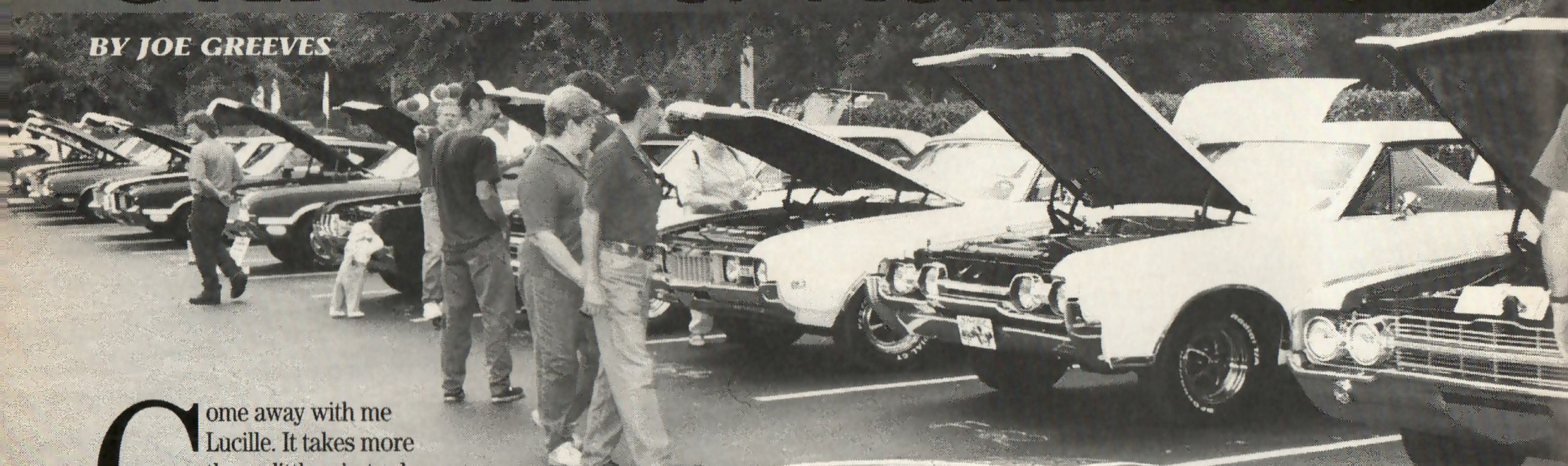
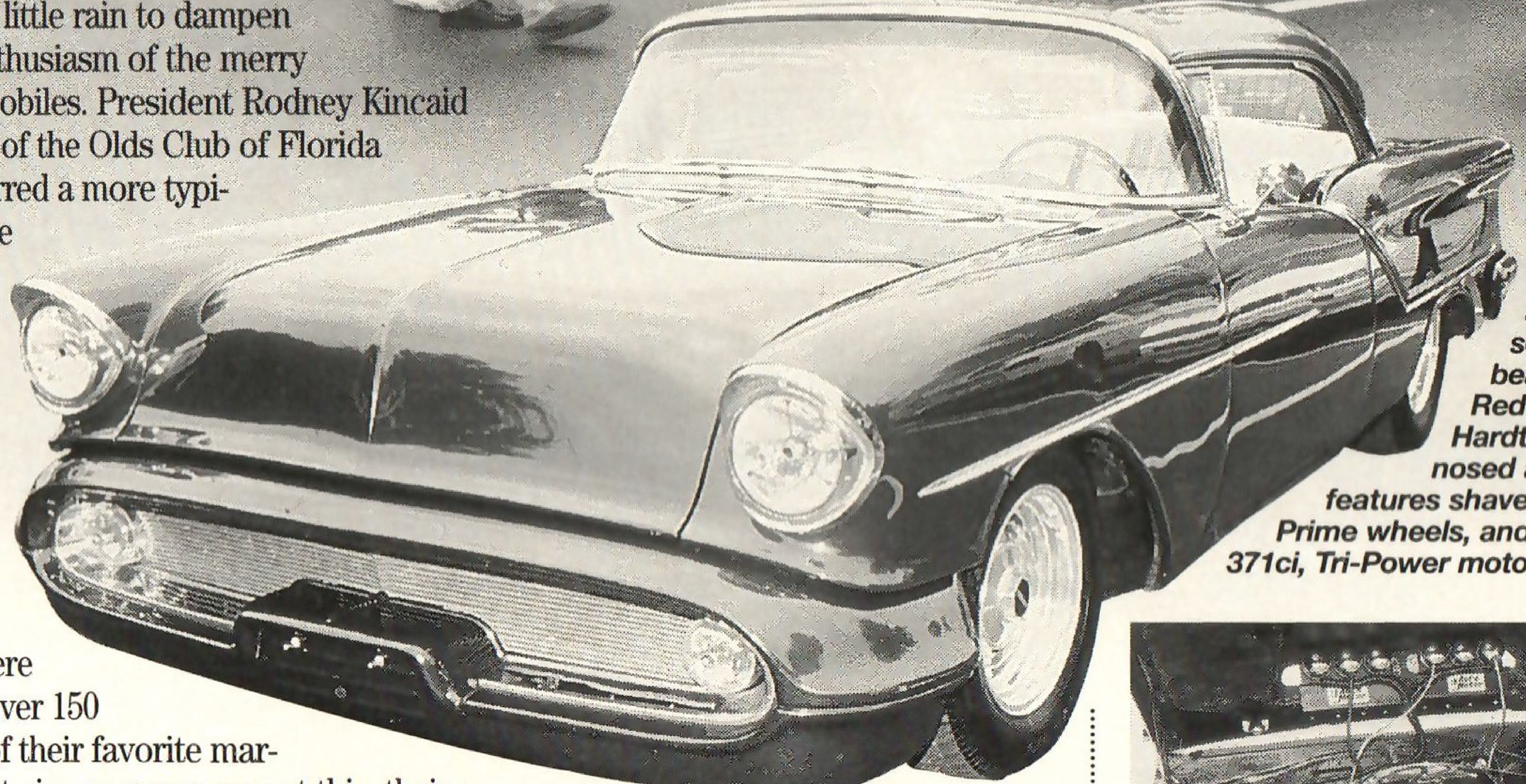
The Second Annual
Olds Club of Florida Show

BY JOE GREEVES



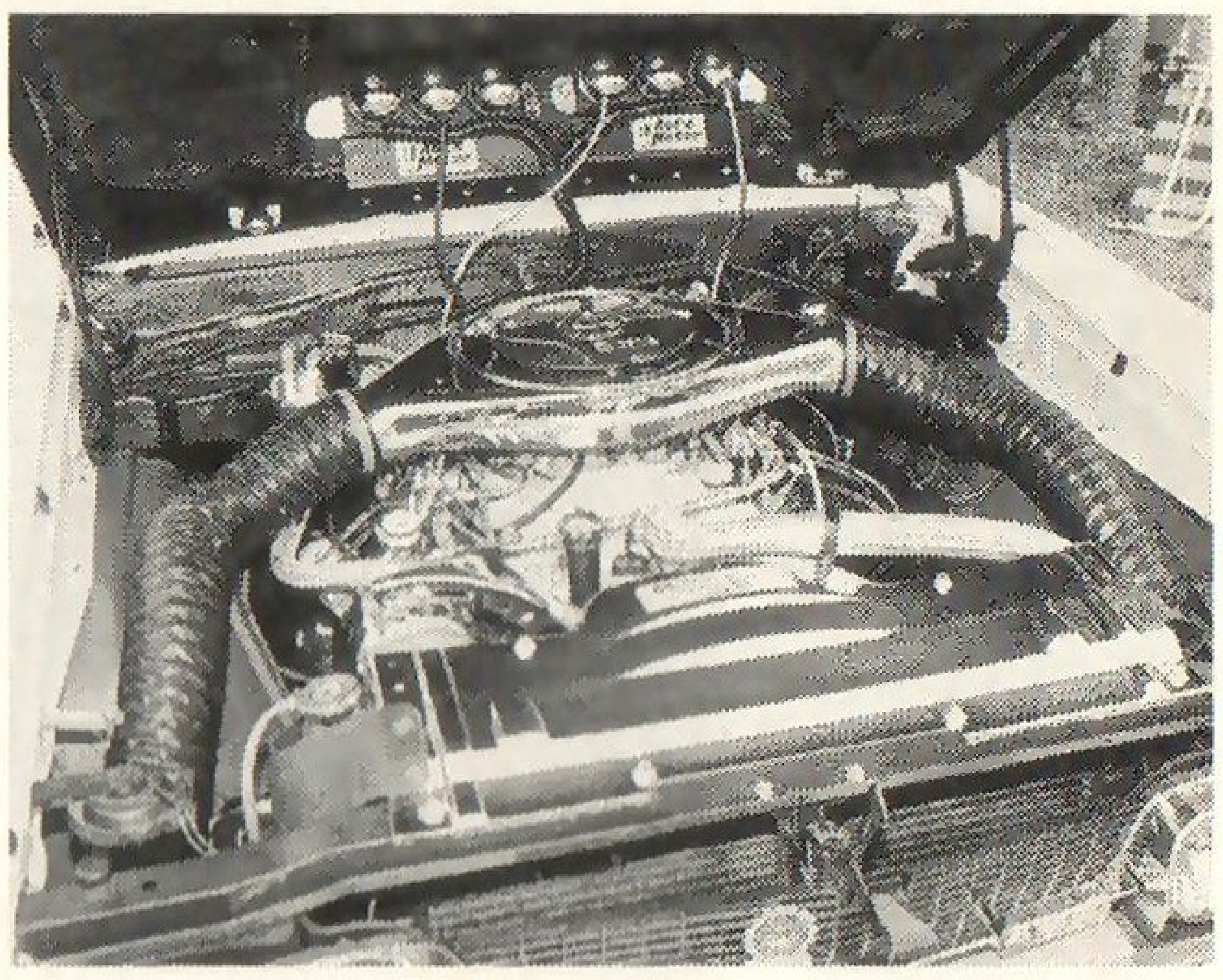


Not all the cars at the show were restored originals, as you can see with this beautiful, Current Red monochrome Hardtop. It's been nosed and decked, features shaved door handles, Prime wheels, and an awesome 371ci, Tri-Power motor.

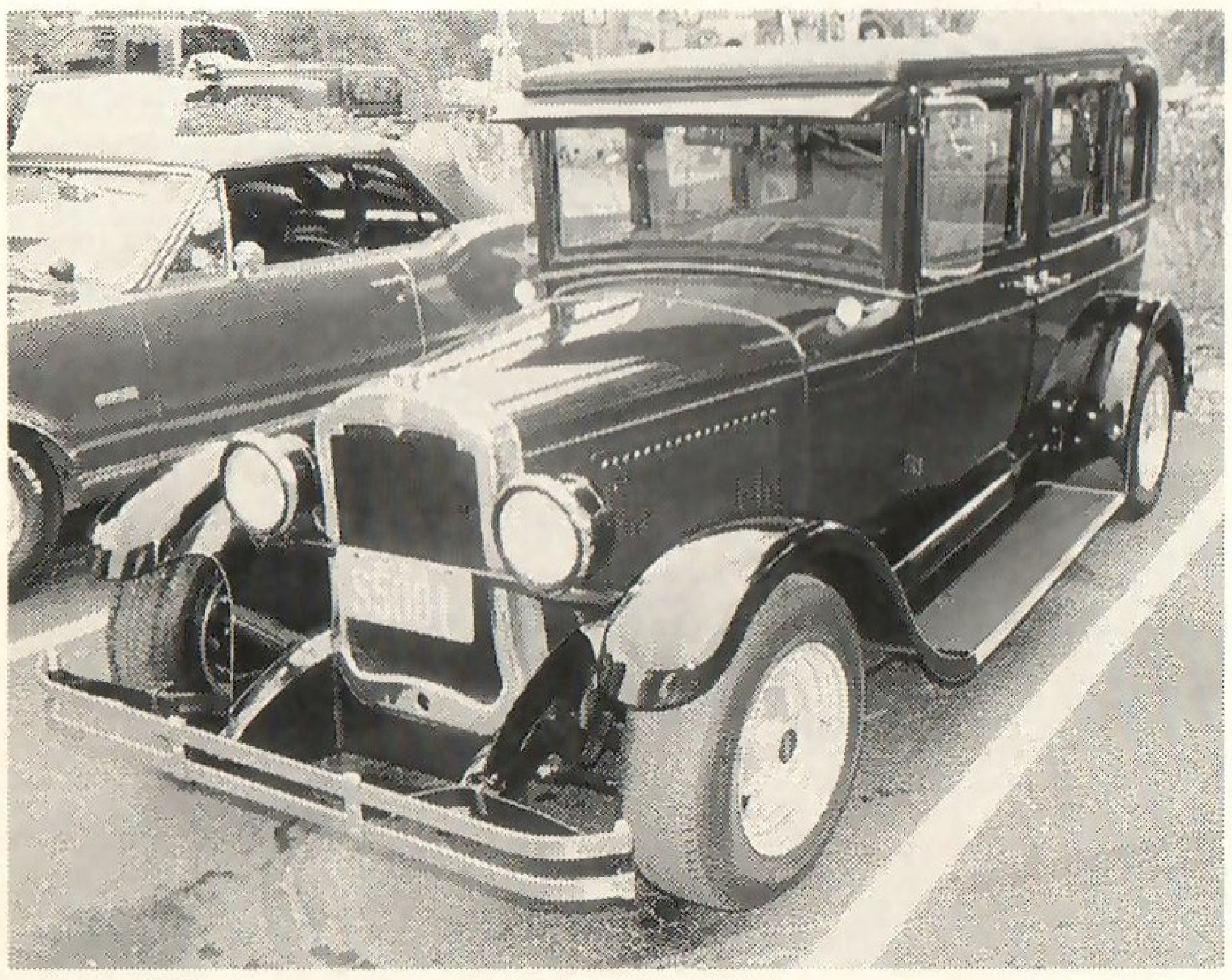
Come away with me Lucille. It takes more than a little rain to dampen the enthusiasm of the merry Oldsmobiles. President Rodney Kincaid and the members of the Olds Club of Florida would have preferred a more typical, Sunshine State day, but at least the late afternoon sprinkle held off until the judging was complete. Throughout the cloudy, but dry morning, drivers and spectators were able to examine over 150 prime examples of their favorite marque. With almost twice as many cars at this, their second annual show, (see *PHR*, Aug '96) the vehicle totals are growing about as fast as the new club membership roster. Three years ago when Kincaid began organizing Olds owners in Florida, he went from virtually no activity in the state, to the fifth largest Olds club in the country by the end of the second year. Now, they've moved up to about third.

Their success comes from a combination of a large number of Florida Oldsmobile owners, a supportive network of seven dealers within the greater Orlando area, and an active, hard-working mem-

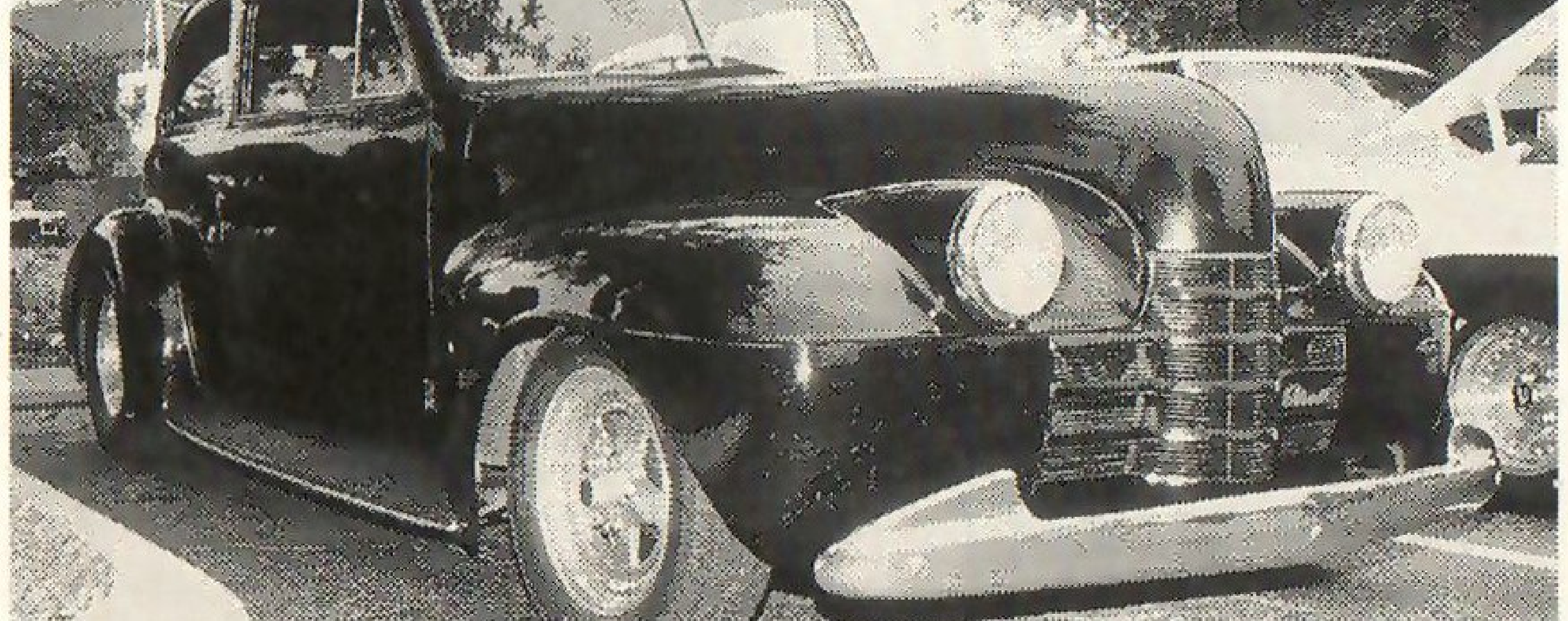
(Continued on page 34)



Among the quicker cars at the event was Bob and Cheryl Hendren's 1967 442 with the 400ci, W-30 engine. The bright yellow hardtop was displayed with time slips that read 11.4 seconds and 115mph. Not bad for a 30-year-old!



This Olds was first restored to original condition and then modernized with a new 350/350 powerplant, power steering, disc brakes and air conditioning. Owners John and Joanna Foster added Prime wheels but kept most of the original body lines in tact.



Tom Ogan drove his big-block Chevy powered '40 Olds from his home in Pensacola, Florida. The LS-6 motor and four-speed feed into a 3.90 rear and coilover, four-link suspension. That makes Tom's Touring Sedan considerably quicker than original Olds designers ever envisioned.

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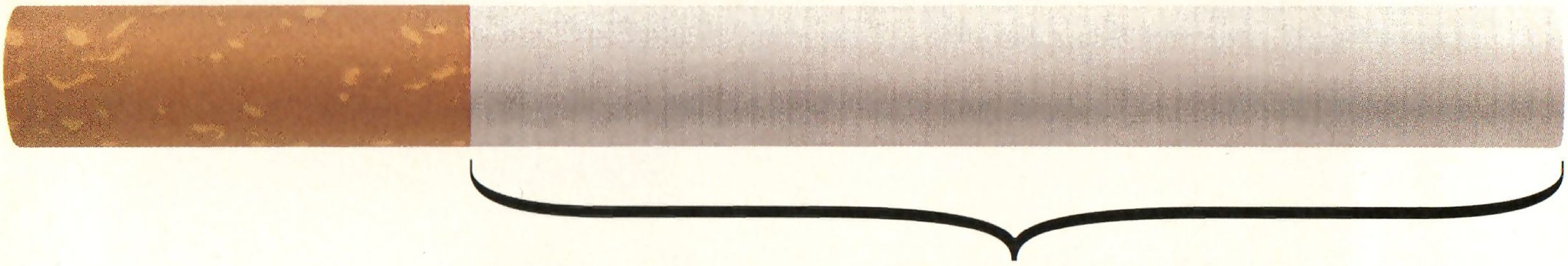

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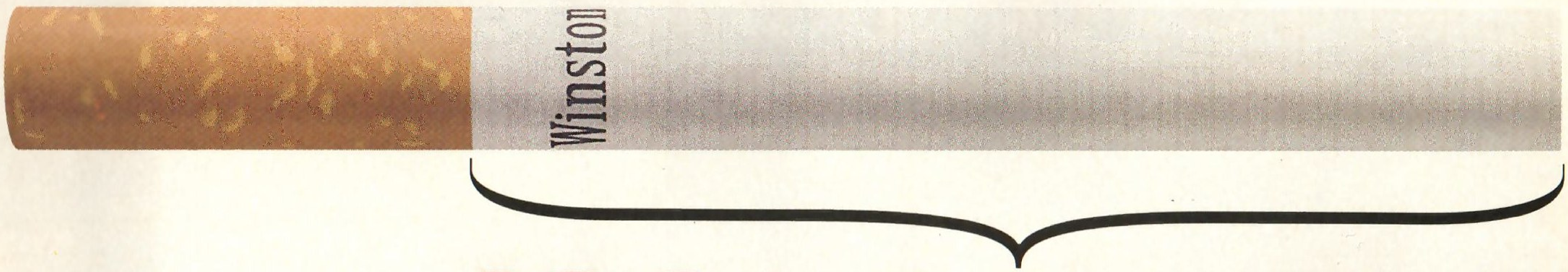

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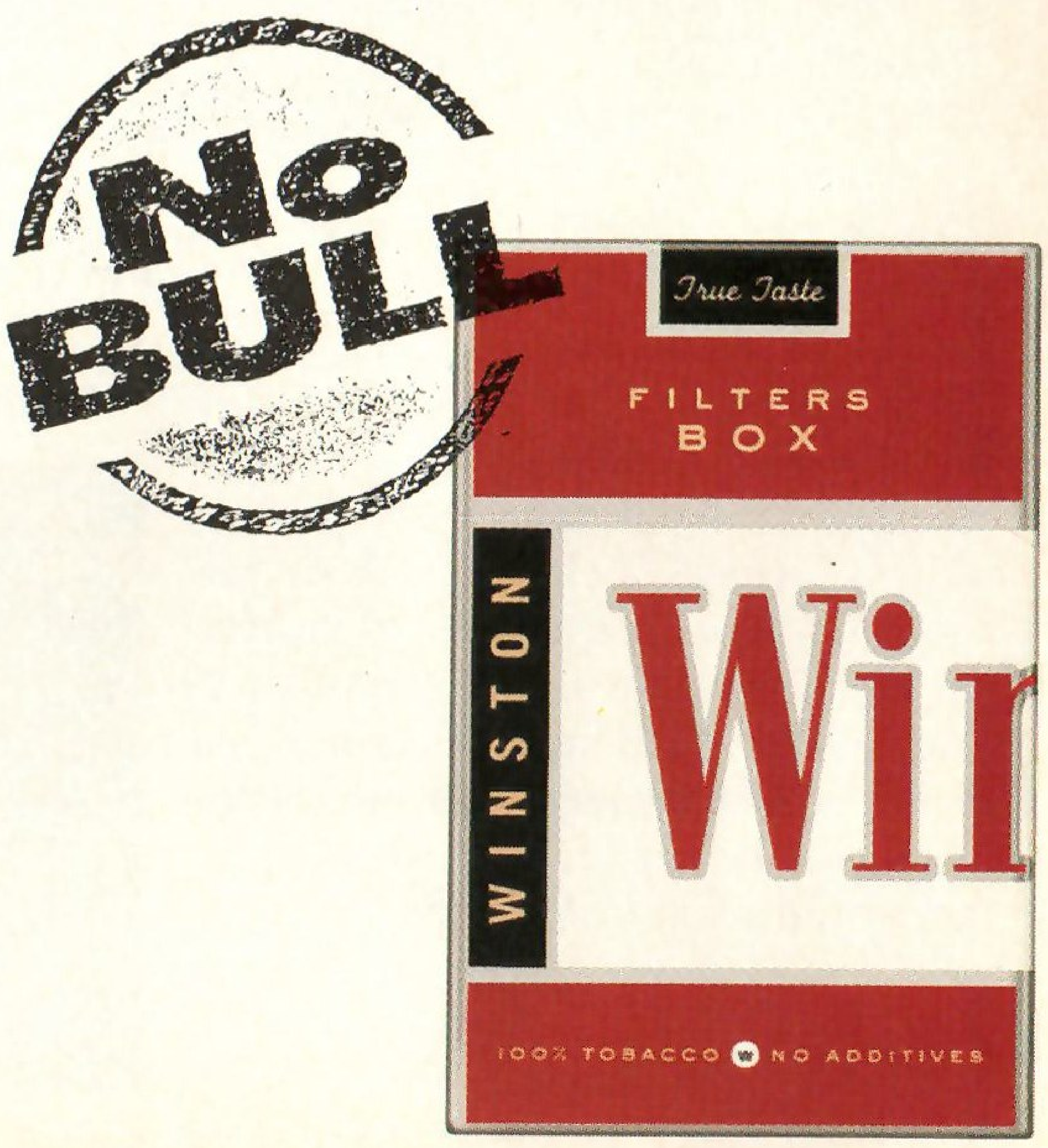
No
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FILTERS
BOX
WINSTON
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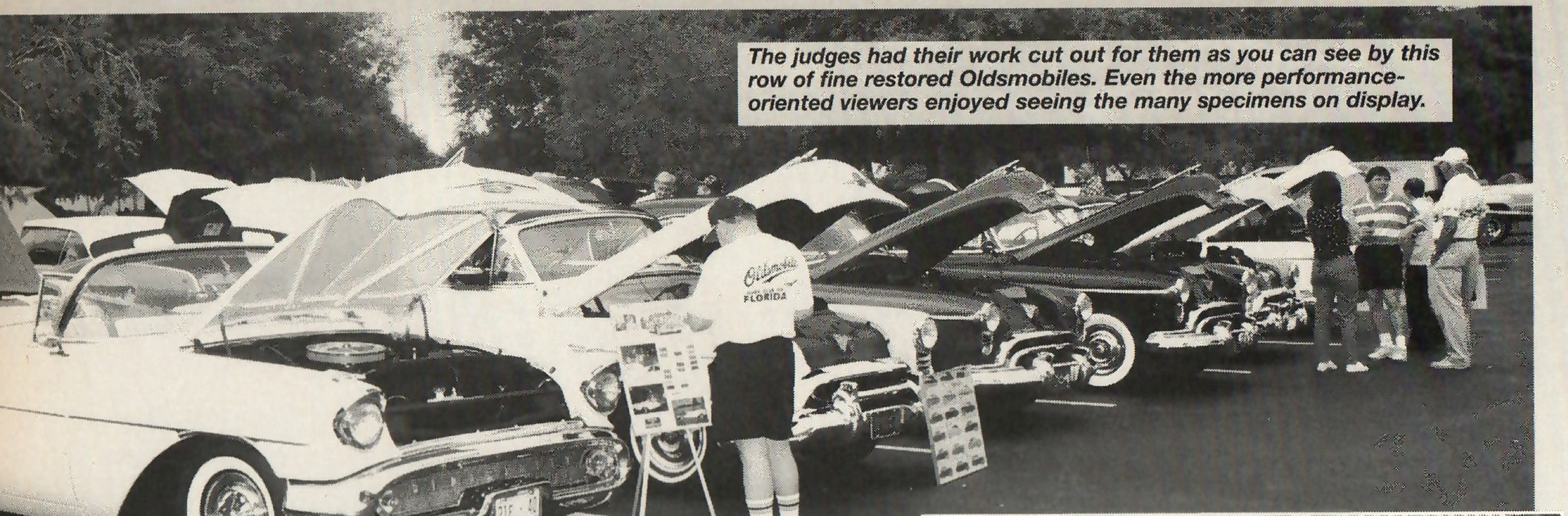
OLDS CLUB OF FLORIDA SHOW

(Continued from page 30)



The judges had their work cut out for them as you can see by this row of fine restored Oldsmobiles. Even the more performance-oriented viewers enjoyed seeing the many specimens on display.

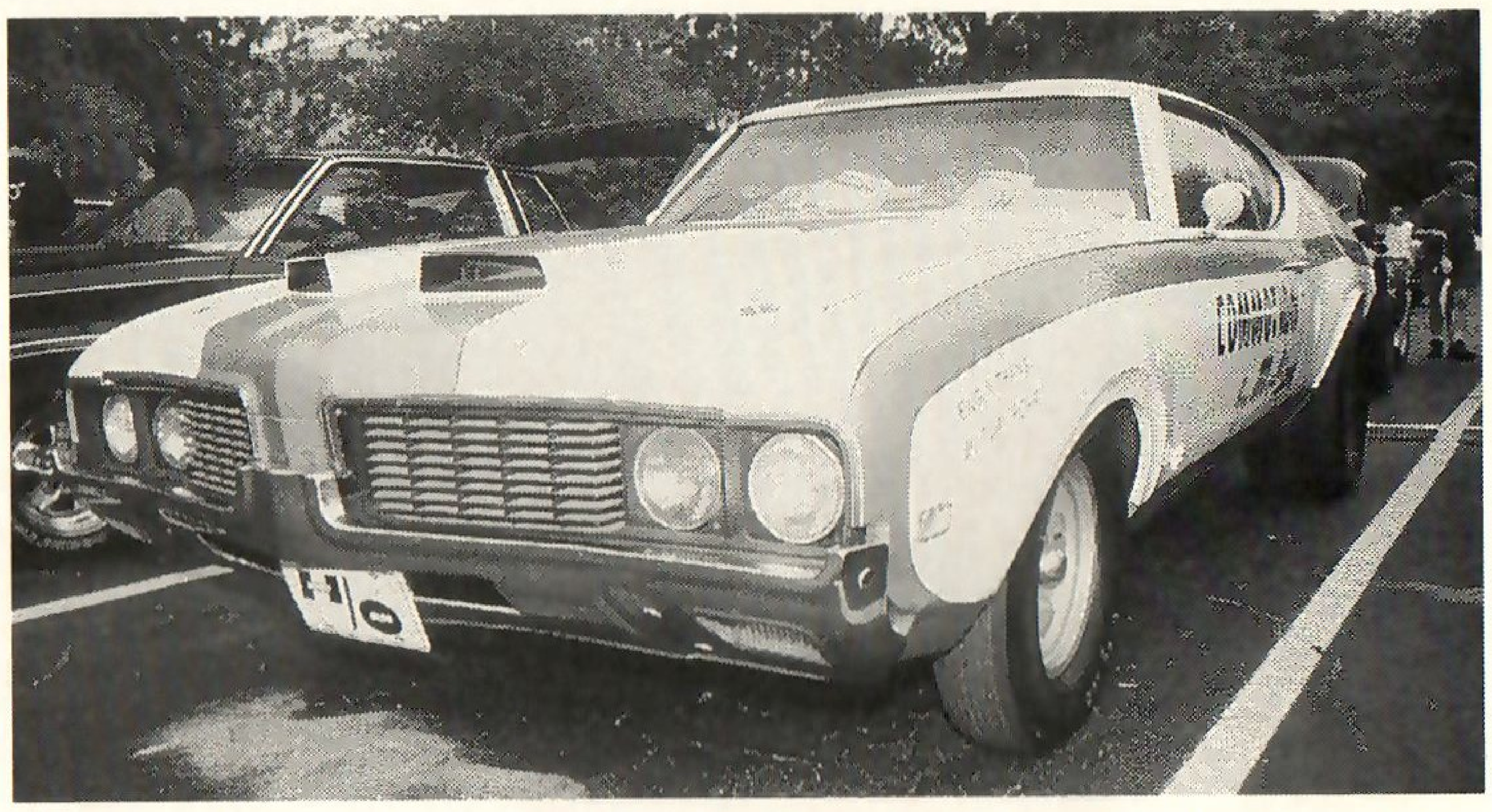
bership. The judging teams trained for weeks before the show, learning the Olds Club of America score sheet and how to use it. This judging technique means you are competing against the 1000-point score sheet rather than the car next to you. Awards were given based on point totals plus, there were *Best in Class* trophies along with a half dozen *Best Of* awards. In all, over 150 trophies were given out; making sure participants went home smiling.

Future plans for the Florida Olds Club include joining in the Oldsmobile 100th anniversary celebration in Lansing, Michigan. Olds owners from Florida were scheduled to caravan to Michigan during in late August, picking up other Olds clubs on the way, and being hosted by area Olds dealerships each evening. By the way, who said we only write about Chevys?

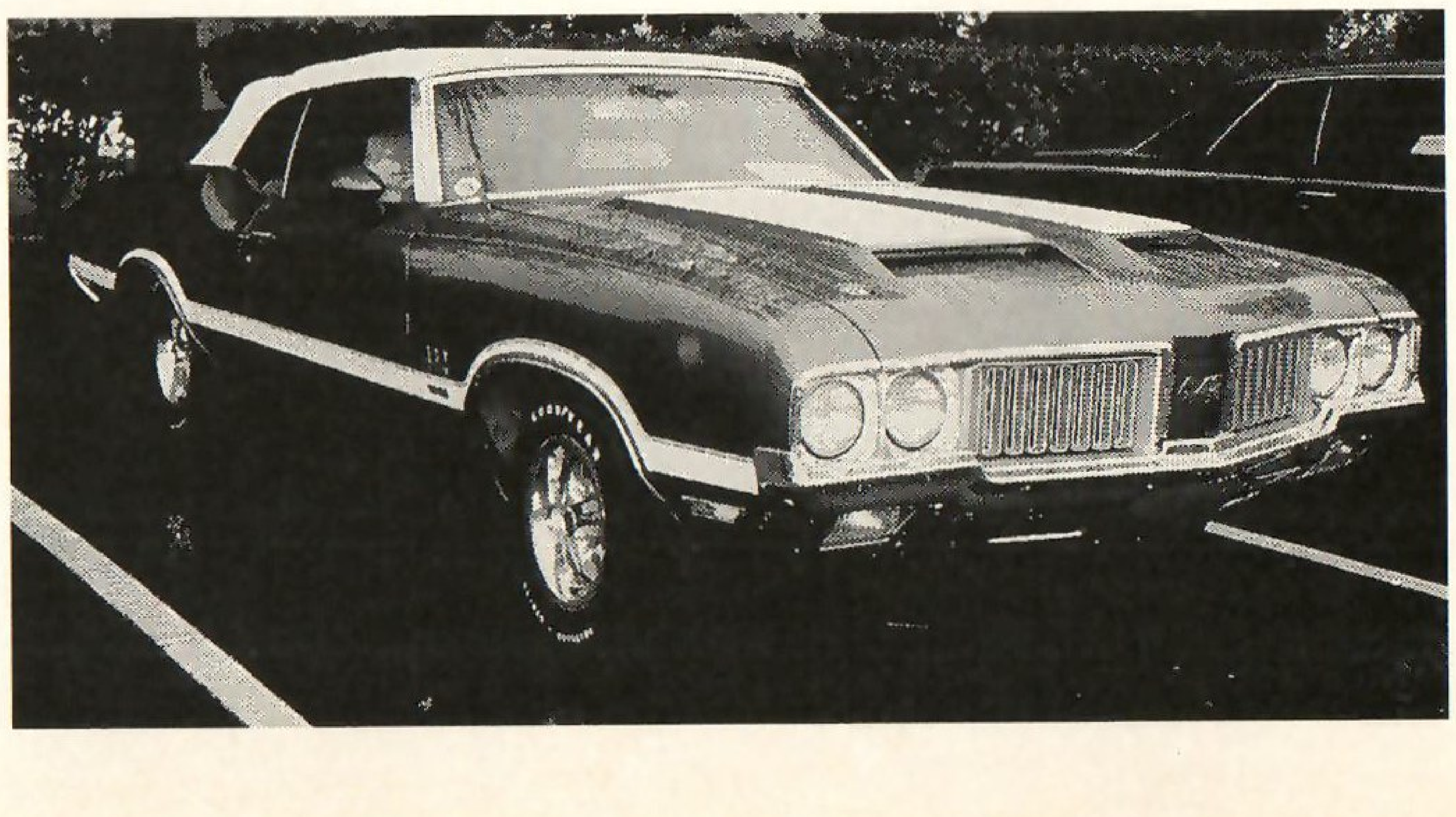
Don Mealy Olds/Cadillac (one of the show sponsors) brought out an assortment of future collectibles for swap-happy shoppers.

Vendors had everything from toys for the kids, crafts for the ladies, new and old parts for the guys, and food for the hungry and tired (who were worn out from wandering the rows of great cars).

A smiling Drew Koba accepts the Best in Show award from Don Meally Olds rep, Whit Gilman. Koba, the Parts Manager for King Olds, took Best Engine as well, with his beautifully restored 1970 442 Convertible.



The fat slicks on the back of Bob Anderson's '67 Hurst Olds attempt to hook up the power generated by the 455 under the hood. Decked out in the traditional gold and white Hurst colors, Bob calls it "Commotion."



Unfortunately, the showers had set in by the time we got to photograph Drew Coba's award-winning convertible. However, the rain didn't interfere with the flawless workmanship and stunning appearance.

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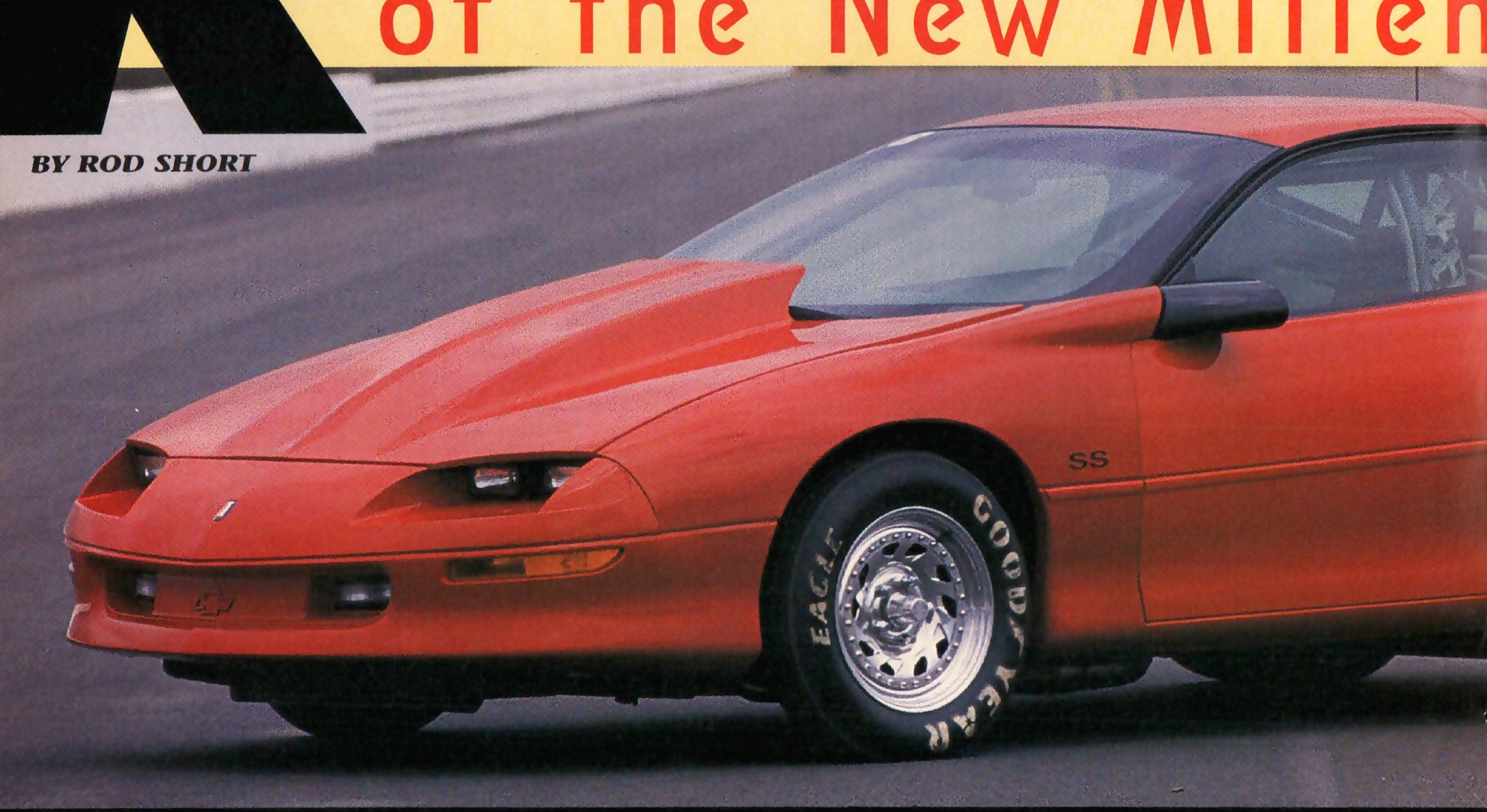
RAIDE
# of the New Millen

BY ROD SHORT



Somewhere between the extremes of NHRA drag racing and vintage muscle car cruisers lies a world of modern performance cars that can drive by day and fly at night. These are the guys that embrace modern technology to produce real, honest-to-goodness street/strip machines that are fun everywhere they go. Donny Bray's 1994 big block Camaro is a classic example of this trend and probably represents what many enthusiasts will be running 30 years from now.

This Street Driven 8-Second EFI Camaro Shows That The Future Is Here Now!

"We drive it all the time," Bray said when asked if this Camaro ever prowls the streets. He liberated this Camaro from a junkyard and hauled it to K & B Race Cars of Bowling Green, Kentucky, where it went from junk car to race car in just over 100 days. There, the car was backhalved, then fitted with a 16-point rollcage, chrome-moly four-link rear suspension and Koni double adjustable rear shocks. The rear frame rails were also notched to help accommodate the 10.5-inch slicks. The front suspension remains stock, right down to the struts and springs.

Fast Times Motorworks of Morton Grove, Illinois, provided a big-block Chevy (displacing 433ci) which actually fits in the engine bay without having to remove the hood. Bray wouldn't reveal the actual bore or stroke dimensions for the powerplant, although pit talk has the dimensions in the 4.260-inch bore and 3.800-inch stroke ranges respectively. A Crower 4340 forged steel crank, Howard aluminum rods, and 14:1 pistons from JE makes up the basis of the reciprocating assembly. Dart "Big Chief" heads with 2.375/1.90 valves, spread ports and heart-shaped combustion chambers offer unparalleled breathing.

Despite finishing eighth in NMCA Super Street points during '96 with a normally-aspirated big block, Bray saw the handwriting on the wall and went with an all-new sequential injection system which works with a single throttle body, Dart intake and NOS Big Shot plate system. Developed in part by former NMCA champion Chuck Samuels, Jeff D'Agostino, and FP Performance of Hartland, Michigan, Bray attributes much of the car's performance to this computerized system.

"When you have a Pro Stock-style chrome-moly four-link with all the adjustments that it has, it's easy to put enough bite into the car to flip it over backwards," Bray said. "Based upon Chuck's dyno and his knowledge of Super Street, the computer can lean the car out when the torque converter locks up to keep the car from pivoting on the tires."

Backing up the engine assembly is a TH400 transmission with a Hipster 5000rpm stall converter that was assembled by Advanced Transmission of Wheeling, Illinois. Center Line wheels wrapped in Mickey Thompson rubber applies the torque to the pavement while Dynomax mufflers help route the exhaust gases to the rear.

While vintage supercars will always be cool, late-model muscle like Donnie Bray's state-of-the-art-cherry Camaro will definitely ride the wave to the year 2000 and beyond.

RS

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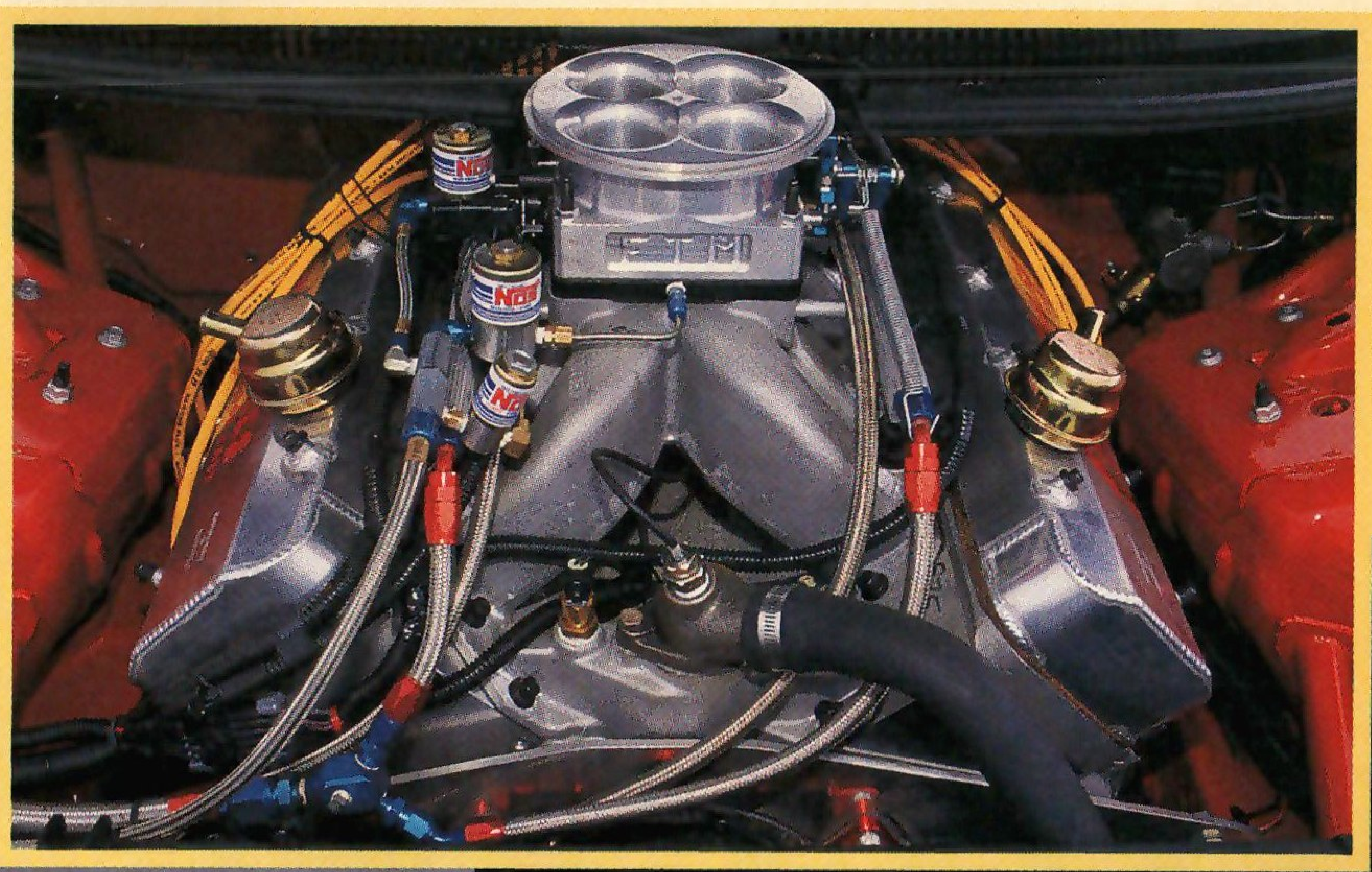

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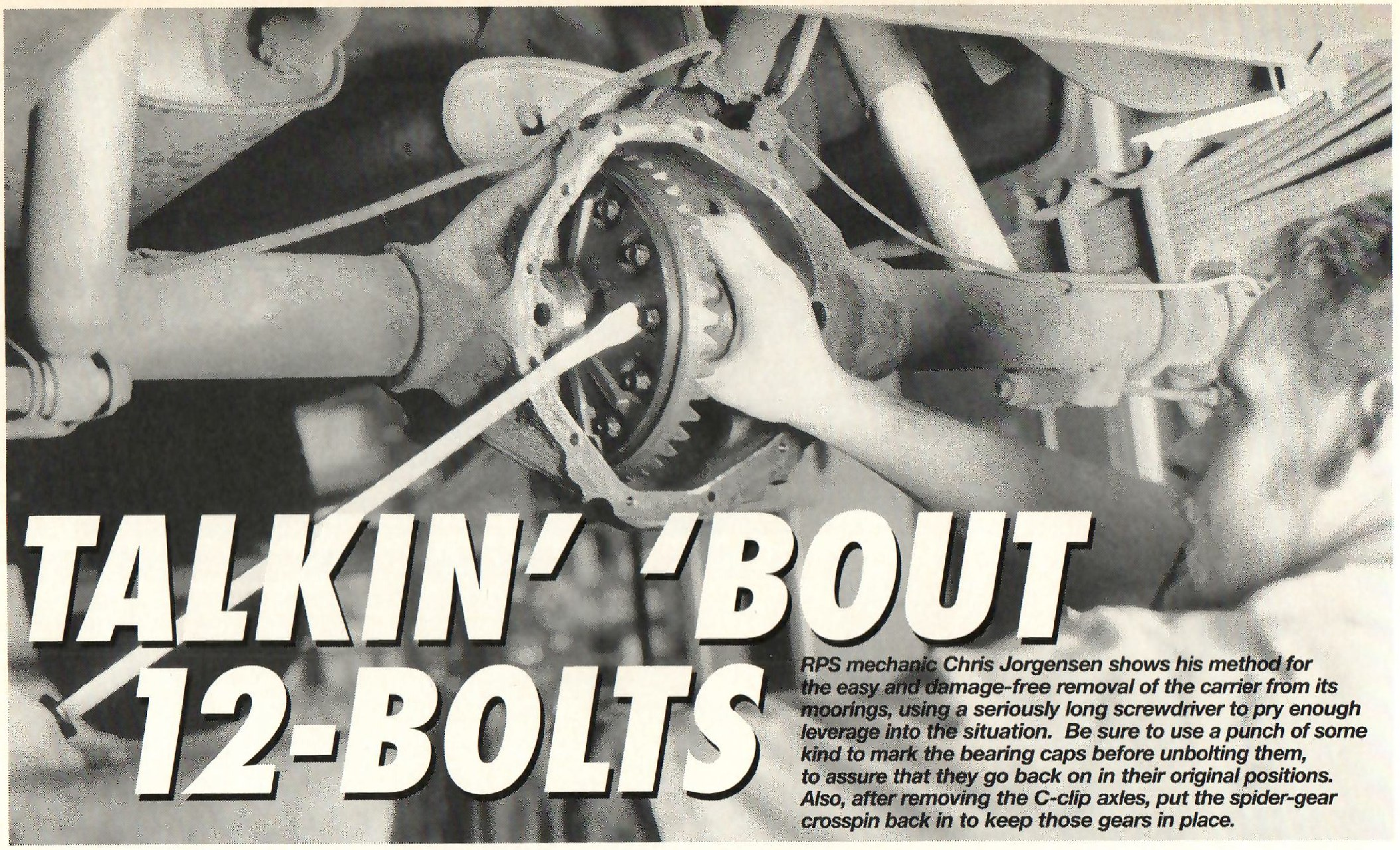


TALKIN' 'BOUT 12-BOLTS

RPS mechanic Chris Jorgensen shows his method for the easy and damage-free removal of the carrier from its moorings, using a seriously long screwdriver to pry enough leverage into the situation. Be sure to use a punch of some kind to mark the bearing caps before unbolting them, to assure that they go back on in their original positions. Also, after removing the C-clip axles, put the spider-gear crosspin back in to keep those gears in place.

TEXT BY SKY WALLACE • PHOTOS BY GOOD COMMUNICATIONS

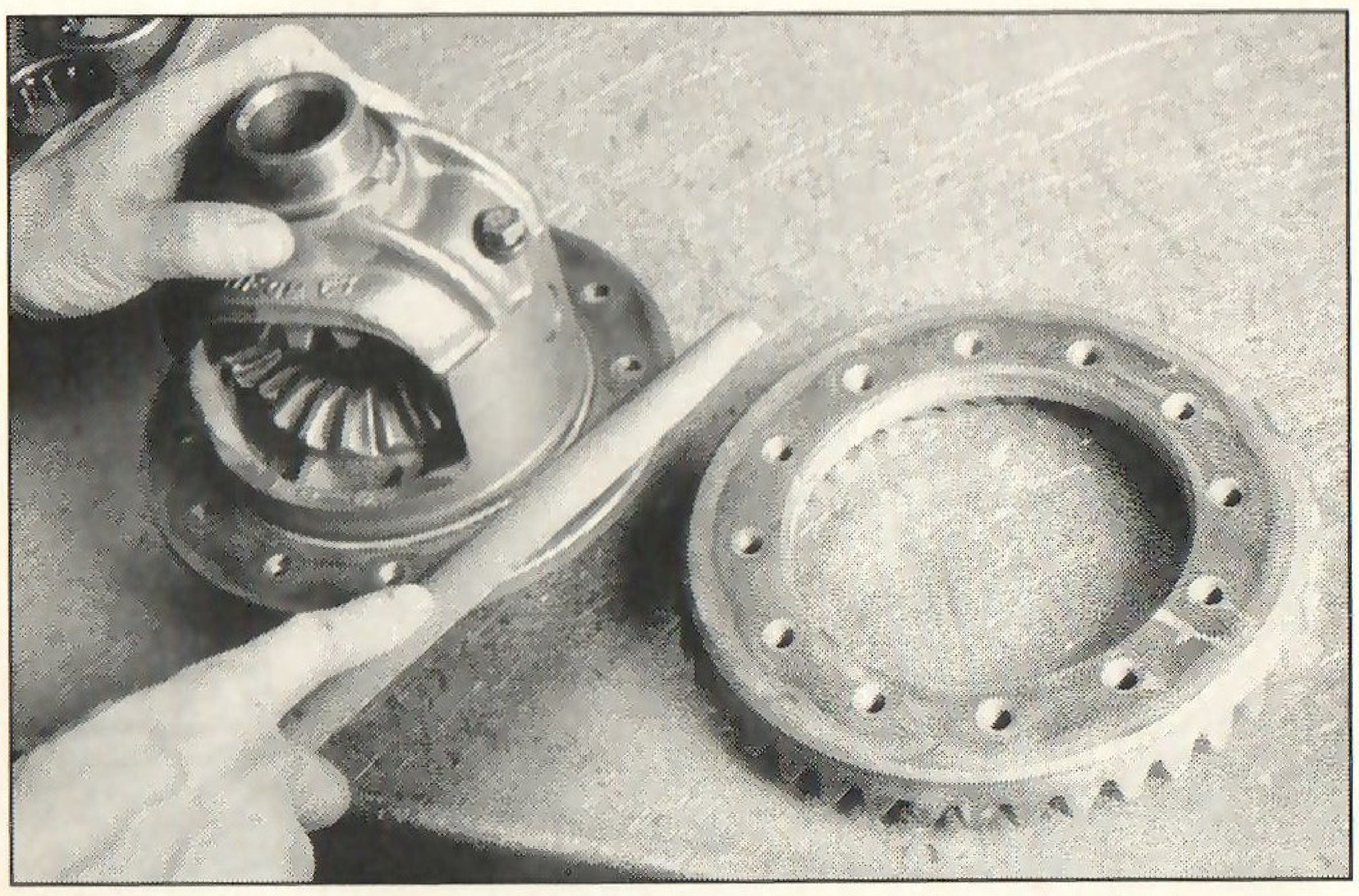
Differential Demystification

Ah, yes, differentials. All of our favorite rear-wheel-drive cars have them, and they generally do their jobs with nary a hint of displeasure or complaint. But if you were in one of the many thousands of cars that were stuck for six hours on the 210 freeway in Los Angeles on the evening of Valentine's Day in 1988, you got to experience second-hand what can happen when one fails.

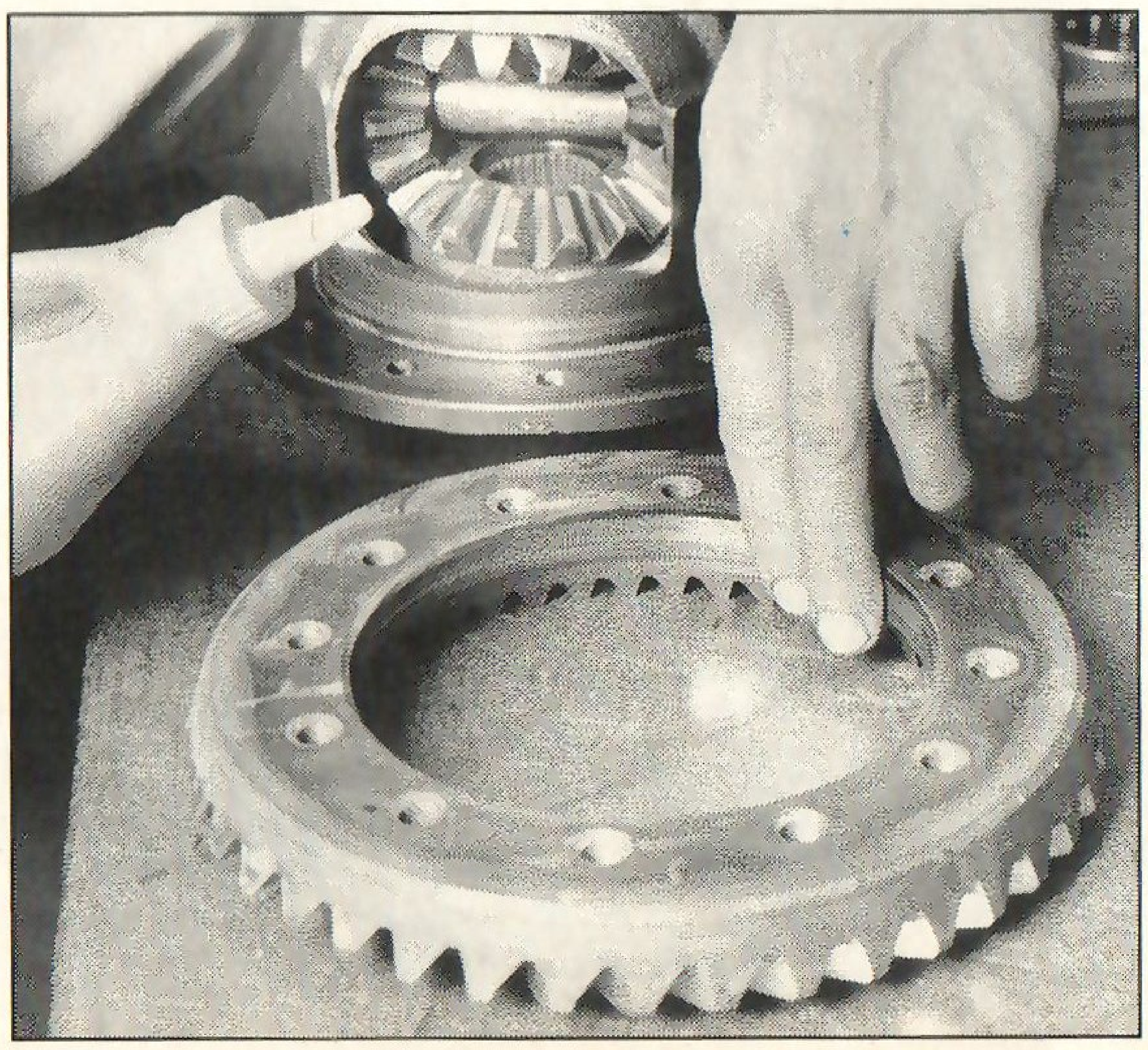
Personally, your humble reporter was at that particular moment in the midst of gaining an unfortunate, first-hand understanding of the carnage that can ensue at such a time. Heading home after attending that year's rain-delayed NHRA Winternationals, I was coasting along at part-throttle down a long, gradual downhill run on the 210 when a low, moaning sound started rumbling through my van. The noise quickly ran up through the entire range of human hearing to an ungodly shriek, immediately followed by an extremely disconcerting, van-shaking "bang!"

The ensuing autopsy would reveal that the pinion shaft had broken in two, with the pinion gear getting jammed between the case and the ring gear, but at the time the only thing I knew was that the van was "rabbit-hopping" all over the freeway.

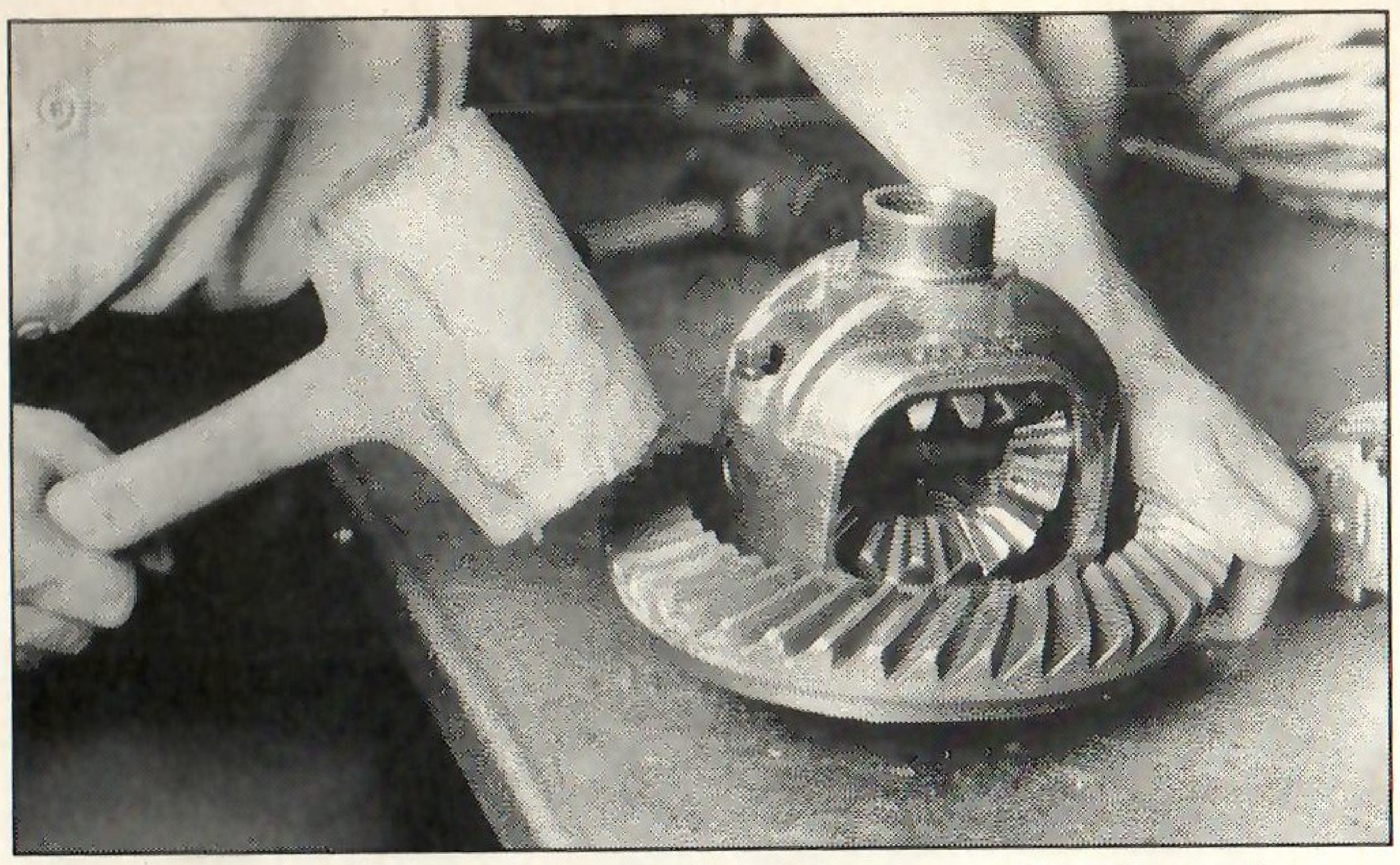
It came to rest partially blocking the right-hand lane; a few minutes later the rest of the lanes were completely blocked, as the driver of a truck hauling over 30



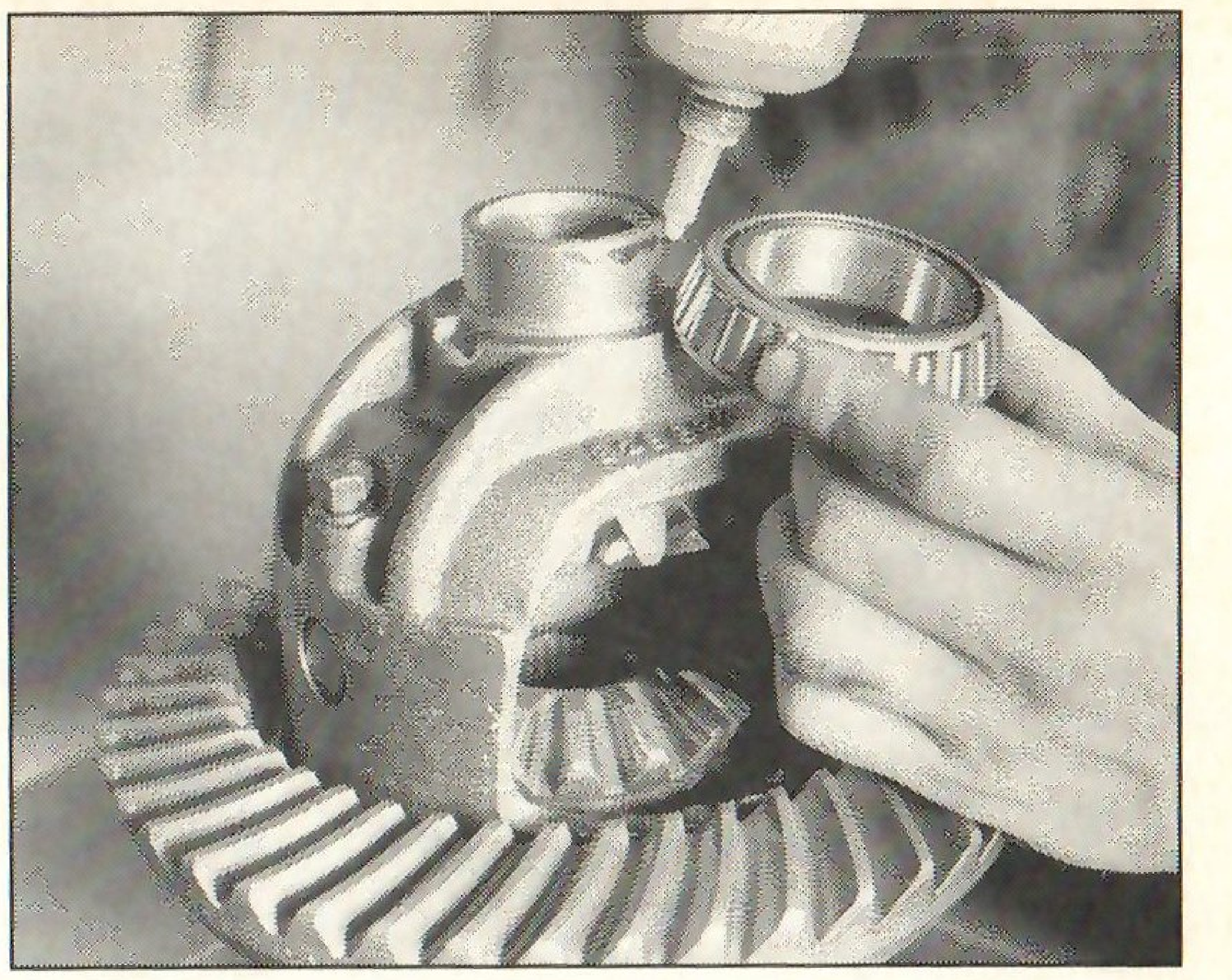
With the old ring gear and bearings removed, it's essential to prep the mating surfaces of the carrier and the new gear by flat-filing both components, then thoroughly wiping them down to remove any particles that would interfere with a perfectly flush fit.



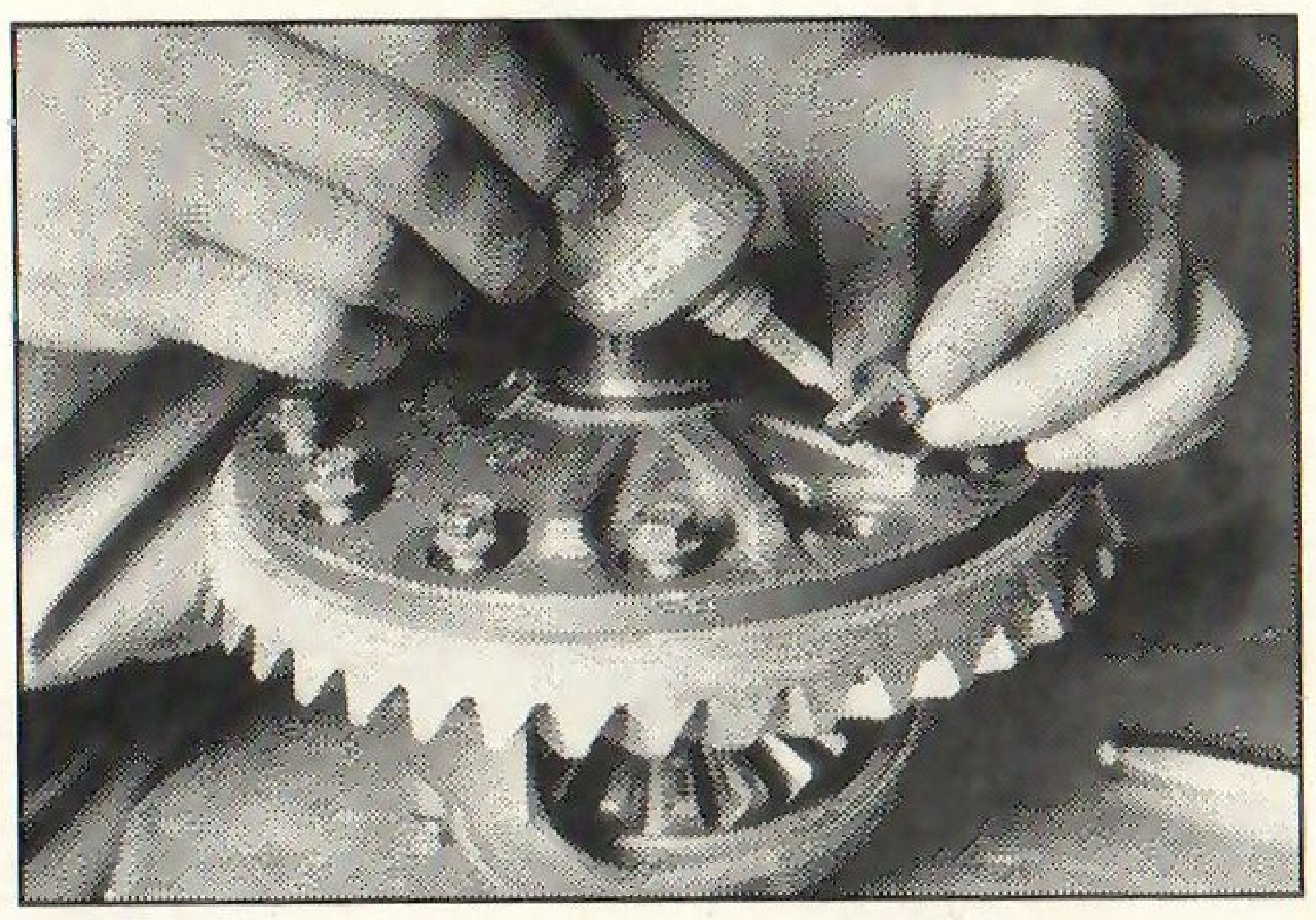
Before attempting to install the gear onto the carrier, RPS suggests applying a light coating of gear oil on the inside of the ring gear, to help ease the interference fit.



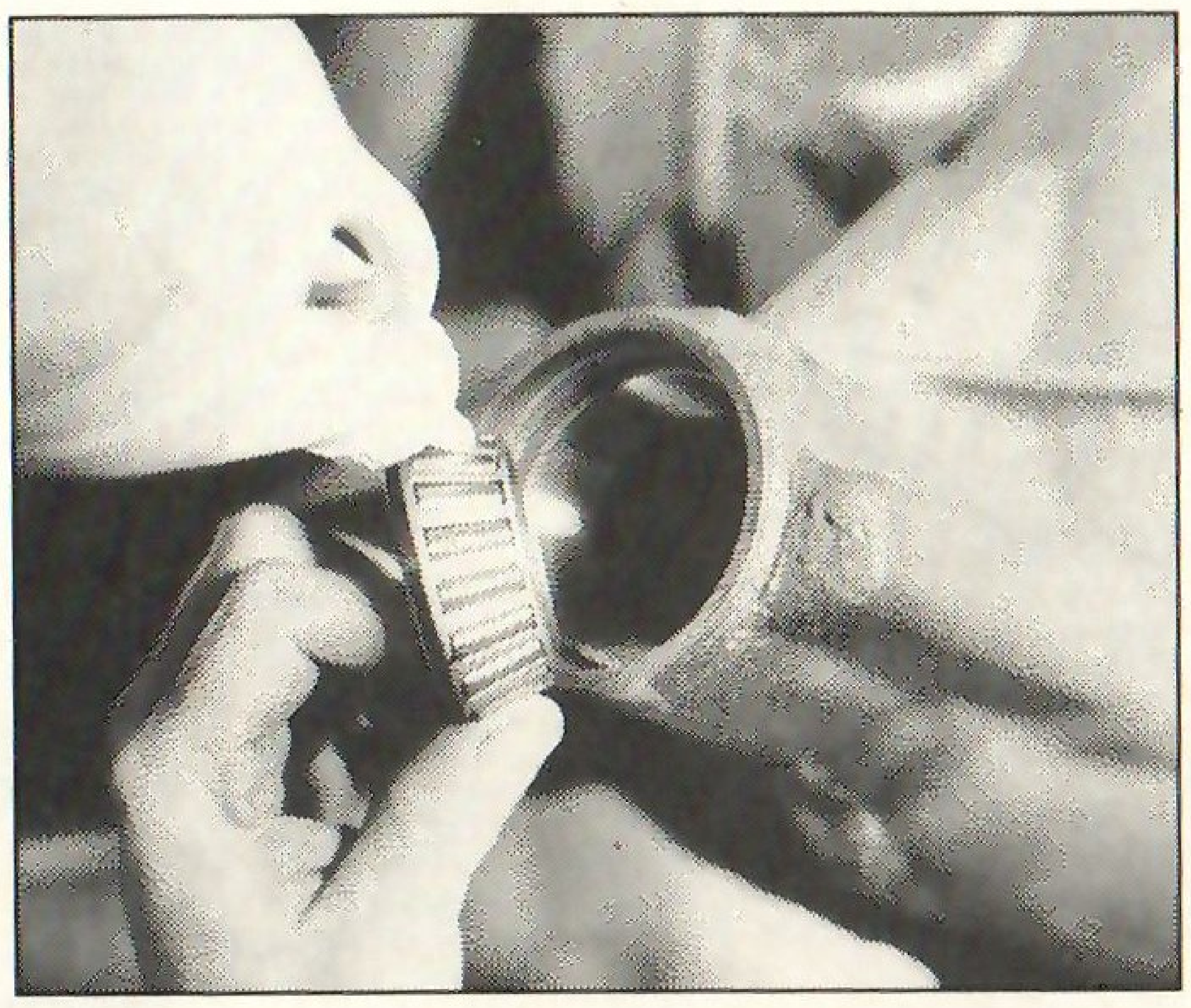
After installing a couple of long bolts of the same diameter and thread pitch as the ring-gear bolts to accurately locate the gear on the carrier, a soft-faced, dead-blow mallet is used to, quite literally, pound the gear into place. RPS prefers this technique to the practice of using the ring-gear bolts to pull the parts together.



If new bearings are needed, RPS suggests that Loctite® also be employed when installing them onto the carrier.



A few drops of Loctite® are applied to all of the ring-gear bolts before they are tightened and torqued to meet the specifications.



When pressing new bearings in place, the RPS mechanics always make sure they are going on straight and not binding. New races were installed in the housing for the pinion bearings. Here, the front bearing is coated with gear oil before being put in place; the pinion seal is then installed to keep it there.

tons of manure smacked full-speed into the back of a rapidly slowing semi loaded with veggies, and all hell broke loose.

The resultant debris in the road caused blowouts on a few of the cars running over it, some of whom played highway-tag up ahead; at the same time, cars in back of my now terminally deformed van got into their own chain-reaction-collision games. And I had thousands of people join me in having romantic-evening plans shot to, quite literally, poop, with tons of the stinky stuff now coating the freeway and combining with various broken vehicles to halt all forward progress.

Candy was melting, flowers were wilting, tempers were steaming, dinners were burning, and sweethearts were fuming throughout the L.A. area . . . and my little old pinion gear caused it all. (And the next morning, two radio drive-time disc jockeys were describing the mess of the night before, and one of them said, "Well, now we know what happens when the manure hits the van!")

Anyway, it was with this tragically hard-earned respect for the proper functioning of differentials that a trip to the state of Washington was scheduled, to check out the headquarters of Ring & Pinion Service. Randy Lyman, the founder and head honcho of RPS, figures he has personally worked on over 2,500 differentials, while a total of about 30,000 have limped into, and rolled out of his shop in Everett, Washington. In addition to overseeing his staff of mechanics, Randy also operates a thriving mail-order business that supplies parts, information, and detailed installation instructions to an ever-widening customer base of both the home-builder set and other shops that work on differentials.

The holder of a degree in Physics with a concentration in Mechanical Engineering, Randy arrived at his specialty largely by the typical process of doing what he liked. He was working on differentials for himself and his friends, and eventually came to realize that he was, for all intents and purposes, in business. The fact that the diff components were relatively compact and easy to transport held great significance for him while he was working out of his house, back in his school days.

He also discovered that there was an overwhelming scarcity of reliable, concise, and easily available information on successful gearset and carrier repair and replacement. As one who feels information is a commodity that should be shared, Randy had no problem in coaching other home mechanics who wanted to work on their own differentials.

In fact, it was through this inclination to "spread the word" that we first became aware of RPS, when the company's 18-page installation-instruction packet, which includes detailed illustrations of both acceptable and unacceptable gear-contact patterns, hit our desk. We have since seen the RPS Internet web site (www.ring-pinion.com), which provides the intrepid Web explorer with more than one would ever hope to know about what resides within the differential housing: an examination of common differential-related myths; set-up hints and specs; a brief run-down of some positraction-related details; and instructions (and warnings!) for the break-in period of new gearsets, among other things. Can you say "extensive information," boys and girls? Sure, we knew you could.

But back to the matter at hand — a typical ring-and-pinion installation in a GM 12-bolt housing. Throughout the photo session we asked loads of questions, looking for the secrets, the tricks, the magic of the art of successful differential endeavors. We poked, we prodded, we undoubtedly annoyed, but the answer was always the same: just careful, patient, and precise work; the strict measurement of, and adherence to, the recommended tolerances; and a good contact pattern on the ring gear when all is said and done.

What we did learn were some of the little touches and details that can usually be achieved only through working with a

(Continued on page 42)

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Ford SB.	*19009*	$24.95
Ford 351C/M-400	*19010*	$24.95
Ford 360-390-428	*19011*	$24.95
Ford 429-460. . . .	*19012*	$24.95
Oldsmobile V8 . .	*19013*	$24.95
Pontiac V8.	*19014*	$24.95

VALVE COVER ACCESSORIES

Breather & Grommet	*19100*	$2.95
V.C. T Bolts (long) .	*19101*	$1.95
V.C. T Bolts (short) .	*19102*	$1.85
Hold Down Tabs (long)	*19103*	$1.50
Hold Down Tabs (mini)	*19104*	$.75

AIR CLEANERS

14" Low Profile . .	*19500*	$17.95
10" Low Profile . .	*19501*	$11.95
6" 4-Barrel	*19502*	$8.95
6" 2-Barrel	*19503*	$8.95

TIMING CHAIN COVERS

Chevy SB . .	*19225*	$4.95
Chevy BB . .	*19226*	$7.95
SB Timing Tab . .	*19227*	$1.50
BB Timing Tab . .	*19228*	$1.50

MISC. ACCESS.

Chevy SB Dipstick	*19150*	$3.95
Chevy BB Dipstick	*19151*	$4.99
Chevy SB Early Breather Tube	*19152*	$3.99
Push-in Cap (for above)	*19153*	$3.99
Fuel Pump Block-Off Plate **(SBC)**	*19154*	$1.50
Fuel Pump Block-Off Plate **(BBC)**	*19155*	$1.60
Coil Cover & Bracket	*19156*	$2.20
Distributor Hold-Down **(Chevy)**	*19157*	$2.50
Distributor Hold-Down **(SB Ford)**	*19158*	$2.50
Fuel Line (Holley #3310-2)	*TDP-2198*	$14.95
Fuel Line (Double Pumpers)	*TDP-2197*	$14.95

COIL & BRACKET

Chrome Coil & Bracket	*19400*	$16.95

CHROME OIL PANS

As Low As $39.95

Chevy Early SB 5 Qt. '55-'78 . . .	*19300*	$39.95
Chevy Late SB 5 Qt. '79-'85 . . .	*19301*	$39.95
Ford SB 289-302 '65-'85	*19303*	$49.95
Chrysler 318-340	*19304*	$49.95
Chrysler 360 . . .	*19305*	$49.95
Ford 460	*19306*	$49.95
Chevy BB	*19307*	$49.95

WATER PUMPS

Chevy SB Short .	*19450*	$79.95
Chevy SB Tall . .	*19451*	$79.95
Chevy BB Long .	*19452*	$89.95
Chevy BB Short .	*19453*	$89.95
Chevy Bolt Sets		$6.95

ALTERNATORS

GM (Int. Reg.) . .	*19275*	$99.95
GM (Ext. Reg.) .	*19276*	$99.95
Ford	*19277*	$99.95
Chrysler	*19278*	$129.95

Milodon DEEP SUMP OIL PANS

From As Low As . . $134.95

Milodon LOW PROFILE OIL PANS

From As Low As . . $129.95

Milodon HI-VOLUME WATER PUMPS

From As Low As $69.95 *SB Chevy*

FEL-PRO Complete Gasket Sets

SB Chevy from $38.95

We Carry a Full Line of *FEL-PRO* Regular & High Performance Gaskets.

ECONOMY TRANSMISSION COOLERS

12,000 GVW . . .	*#13101*	$28.95
14,000 GVW . . .	*#13102*	$30.95
18,500 GVW . . .	*#13103*	$35.95
20,500 GVW . . .	*#13104*	$39.95
22,500 GVW . . .	*#13105*	$45.95

Installation Kits Included.

HD ENGINE OIL COOLER KIT

Thermostatically controlled. Fits Ford, GM & Chrysler. *#15502* . . $72.95

THIN-LINE REVERSIBLE ELECTRIC FANS HAYDEN

10".	#3670	$62.95
12".	#3680	$69.95
14".	#3690	$79.95
16".	#3700	$92.95
Adj. Thermostat Kit . .	#3647	$27.95
Reg. Thermostat Kit . .	#3652	$19.95

CUSTOM CRANKSHAFT SPECIAL

377	383	385	388
STD. BORE	030 OVER	040 OVER	060 OVER

CUBIC INCHES FROM YOUR **350 CHEVY**

- *FORGED PISTONS* *Flat Top TRW Pistons*
- *MOLY RINGS*
- *CONNECTING RODS*
- *CON ROD BEARINGS & MAIN BEARINGS*
- *CUSTOM GROUND CRANKSHAFT*

$649.00

Chrome Moly Rod Bolts . . . . . *ADD* $60.00

NOTE: Above kit requires harmonic balancer & flywheel from 400 Chevy.

BLOCK KIT SPECIAL

350 CHEVY

• Unassembled • 4 Bolt Mains
• 9:1 or 10:1 Comp. Ratio
• Street • Strip
• RV • Competition

Available in 383-385-388. . . Add $300.00

SHORT BLOCK KIT– 350 4-Bolt Mains, block bored oversized, honed for moly Rings. Decked, lined honed, painted inside Rustoleum, outside factory orange. Fitted Cam Bearings & brass Freeze Plugs. Forged TRW Pistons fitted to PAW heavy-duty con rods w/MILODON chrome moly Rod Bolts. Chrome moly Rings, Crankshaft custom ground on Rod & Main Journals. Micro polished w/quality Rod & Main Bearings for perfect fit. Double roller timing chain set, your choice hydraulic or solid Camshaft. Assembly balanced for maximum performance.

Your Low Price **$1195.00**

LONG BLOCK KIT– As above w/Cylinder Heads, Performance Valve job. New Valves 1.94" intake & 1.50" exhaust. Hi-Performance Springs, HD Locks. Chrome moly Push Rods, Lifters, Hi-Volume Oil Pump, complete Gasket set & long slot Rocker Arms.

Your Low Price **$1595.00**

OPTIONS: 11:1 Compression Ratio ***ADD $100.00*** • Steel Crankshaft ***ADD $150.00*** • Cylinder Heads w/2.02 & 1.60 Valves ***ADD $75.00*** • Cylinder Heads w/Screw-in Studs & Guide Plate s ***ADD $60.00*** • Bow Tie Heads with screw-in Studs & Guide Plates and 2.02 & 1.60 Valves ***ADD $550.00*** • Main Stud Kit (4 bolt Main) ***ADD $59.95*** • Head Stud kit ***ADD $125.95.***

–SPECIAL– FLAT TOP PISTONS & RINGS

Available in STD-030-040-060

CAST	TRW FORGED
from: $103.00	from: $209.00

Flat Top Pistons available for most Chevy V8's
— Phone for Your Low Price —

Auto Meter Autogage STREET TACHS

- *0 – 8,000 RPM*
- *3-3/4" Diameter*
- *Redline Pointer*

$41.95	$49.95
Black *#2300*	Chrome *#2301*

GAUGE CONSOLES

Black Two-Gauge Console (Oil/Water)–*#2345*.	$32.95
Black Three-Gauge Console (Oil/Water/Volts)–*#2348* .	$42.95
Chrome Three-Gauge Console (Oil/Water/Volts)–*#2349* .	$42.95

Crane Cams MAX VELOCITY CAMSHAFTS

- *Increased Low-End & Mid-Range Torque PLUS Upper RPM Power*
- *Improved Throttle Response*
- *1000-5500 RPM Range*

As Low As . . $84.95 SB CHEVY

COMMANDER CAMS

- *Fair Idle • Moderate Performance*
- *Good Mid-Range RPM (2500-5000)*

As Low As . . $84.95 SB CHEVY

Manley VALVES O.E.M. REPLACEMENT VALVES

Legal N.H.R.A. Replacement

From As Low As. . . . $2.95 SB Chevy #1078

B&M TORQUE CONVERTERS

As Low As: $89.95

AUTOMATIC SHIFTERS

As Low As: $96.95

SHIFT IMPROVER KITS

Most Applications: $24.95

ACCEL OR Mallory DISTRIBUTORS

– DUAL POINT –

MECH.	ACCEL	MALLORY
Chevy V8 .	$105.95	from $89.95
Ford	$118.95	from $94.95
Chrysler . .	$118.95	from $94.95
VACUUM	**ACCEL**	**MALLORY**
Chevy V8 .	$133.95	from $94.95
Ford	$142.95	from $124.95
Chrysler . .	$144.95	from $124.95

– ELECTRONIC –

MECH.	ACCEL	MALLORY
Chevy V8 . .	$174.95	from $154.95
Ford	$175.95	from $153.95
Chrysler. . .	$181.95	from $189.95
VACUUM	**ACCEL**	**MALLORY**
Chevy V8 . .	$185.95	from $167.95
Ford	$200.95	from $194.95
Chrysler. . .	$206.95	from $219.95

SUPERCOILS

	Your Low Price
ACCEL Supercoil	$48.95
ACCEL HEI Supercoil	$49.95
ACCEL Elec. Supercoil late model	$49.95
ACCEL Yellow Superstock . . .	$26.95
MALLORY Voltmaster	$77.95
MALLORY Pro-Master . . from	$58.95
MSD Blaster . . . . from	$30.95
MSD Pro Power	$113.95
40,000V Perf. Chr. Coil & Brack.	$16.95

Street Blue Wire 7mm $8.95

• ***7mm*** *Yellow Silicone* . .	$11.95
• ***8mm*** *Yellow Silicone* . .	$19.95

– Straight or Angle Boots –
– Solid Core and Suppression Available –

• ***MALLORY*** *Pro Wire* . . .	$29.95
• ***ACCEL*** *8.8 Graphite* . . .	$47.95
• ***MSD*** *Custom Sets*. . from	$35.95
• ***TAYLOR*** *8mm Pro*	$47.95

MSD IGNITION

MSD 5 *#5200* – Economy/Perf./Street . . .	$84.95
MSD 6A *#6200* – High Performance	$129.95

HOOKER HEADERS

As Low As $117.95

COMP Headers . . . . . . from	$117.95
SUPER COMP Headers . from	$249.95

Super Competition MUFFLERS

MAX FLOW Universal . . . from	$49.95
AERO CHAMBER Universal from	$54.95

– Specify 2", 2-1/4" or 2-1/2"

HEDMAN HEDDERS

from $89.00

We also carry a complete line of Mufflers & Exhaust Systems. Call for prices & additional information.

FLOWMASTER MUFFLERS TURBO STYLE

2-1/4" *#42441* $52.95 ea.

'81-'93 Camaro/Firebird *#42583*	$75.95
Mustang 5.0 *#42443*	$52.95

S.S.I. ALUMINUM ROLLER ROCKER ARMS

Application	Ratio	Stud	Part #	Price
SB Chevy . . .	1.5	3/8"	*10500*	$179.95
SB Chevy . . .	1.5	7/16"	*10501*	$179.95
SB Chevy . . .	1.6	3/8"	*10502*	$179.95
289-302-351W .	1.6	3/8"	*10502*	$179.95
SB Chevy . . .	1.6	7/16"	*10503*	$179.95
289-302-351W .	1.6	7/16"	*10503*	$179.95
BB Chevy . . .	1.7	7/16"	*10504*	$199.95
302 Boss-351C-351M 400-429-460 .	1.73	7/16"	*10504*	$199.95

COMPETITION CAMS HIGH ENERGY CAMSHAFTS

Hydraulic performance and mileage camshafts for daily driven vehicles.

As Low As . . . . $87.95 SB Chevy

Available for most domestic engines.

MAGNUM CAMSHAFTS

Your Low Price From $87.95 SB Chevy

Available for most domestic engines.

MAGNUM ROLLER TIP ROCKER ARMS

V8 Chevy

Priced As Low As $109.95

GASKET SETS

- *SB Chevy • BB Chevy*
- *SB Ford • BB Ford*
- *Pontiac • Olds.*
- *SB Chry. • BB Chry.*
- *Cleveland*

Includes: Rear Main Seals. Bathtub Intake Manifold Gasket not included in some models.

from $17.95 SB Chevy

PERFORMANCE CARBURETORS Holley

- *Brand New*
- *No Seconds*
- *No Rebuilds*

4 BARREL UNIVERSAL/ VACUUM SECONDARY

Non-Emissions / MANUAL Choke

600 CFM *#1850*	$185.95
750 CFM *#3310*	$193.95

HI-PERFORMANCE DOUBLE ROLLER CHAIN SETS

SB Chevy $14.95 ea.

BB Chevy. $24.95	SB Chrys. $29.95
SB Ford . . $24.95	BB Chrys. $29.95

ISKY RACING CAMS MEGA CAMS

The Ultimate Hydraulic Camshaft

From $79.95 *Available for most V8 engines.*

RICHMOND STREET GEARS

GM 12-Bolt . . *from*	$139.00
Ford 9" . . . . . *from*	$159.00
GM 10-Bolt . . *from*	$159.00

Carter AFB Carburetors

(Emission Calibrated/ Electric Choke)

GM	625 CFM	*#9635* . .	$256.95
CHRYSL.	625 CFM	*#9636* . .	$262.95
FORD	625 CFM	*#9637* . .	$262.95

Holley FUEL PUMPS

ELECTRIC

STREET 7 PSI *#12-801* **$62.95**

RACE w/Adj. Reg. *#12-802* **$79.95**

MECHANICAL

CHROME HIGH VOLUME
From **$45.95**

Edelbrock PERFORMER Manifolds

As Low As $102.25

- *Dual Plane Manifold*
- *Improves All-Around Performance and Economy*

TORKER/TORKER II Manifolds

As Low As $92.25

- *Single Plane Man.*
- *Mid-Range Designed*
- *2500 to 6500 RPM Performance Applications*

PERFORMER Carbs

As Low As $195.95

Holley Z-28 TYPE MANIFOLDS

$119.00 *Reg. Price* $152.00
#300-36

WEIAND X-CELERATOR Manifolds

As Low As $82.95

STEALTH Manifolds

As Low As. $96.95

ACTION PLUS Manifolds

As Low As $87.95

WEIAND ALUMINUM WATER PUMPS

As Low As $99.95

Offenhauser MANIFOLDS

Dual Port 360° . . . *from*	$191.95
Equa-Flow 360° . . *from*	$158.95
Port-O-Sonic . . . . *from*	$173.95
Dual Quad . . . . . . *from*	$232.95
Tunnel Rams . . . . *from*	$311.95

ENGINE OVERHAUL SPECIAL

Kit Includes:
- Clevite 77 Rod Bearings
- Clevite 77 Main Bearings *(STD-010-020-030)*
- Engine Gasket Set
- Sealed Power Piston Rings *(STD-030-040-060)*
- *ADD* $16.95 for Moly Rings

From – **$79.00**
327/350 Chevy

AMC	
199 / 232 / 258	$117
290	$154
304	$154
360	$155
343	$155
390 / 401 . . .	$184
BUICK	
231 V6	$110
231 V6 *(Turbo)*.	$138
252	$134
350	$137
455	$171
CADILLAC	
472 / 500. . . .	$197
CHEVROLET	
173 V6 *(80-84)* .	$126
173 V6 *(85-91)* .	$184
194 L6	$122
229 V6	$110
200 V6 *(78-79)* .	$114
230 L6	$109
250 L6	$125
235 L6	$157
262 V6 *(85-86)* .	$190
262 V6 *(87-91)* .	$190

CHEVROLET	
262	$110
265 V8	$105
267 V8	$107
283 V8	$104
292 L6	$134
305 *(75-80)*. . .	$ 86
305 *(81-85) ex.FI* .	$103
305 *(86-late)*	Phone
307 V8	$ 87
327 *(63-67)*. . .	$ 98
327 *(68-69)*. . .	$ 79
350 *(68-80)*. . .	$ 79
350 *(81-85) ex.FI* .	$ 94
350 *(86-late)*	Phone
396	$122
400 SB	$120
402 BB	$123
427 / 454 *(71-79)*	$123
454 *(80-85)*. . .	$133
454 *(86-90)*. . .	$139
CHRYSLER	
170 / 198 / 225	$116
273	$121
318 *(69-late)*. .	$127
340 *(68-73)*. . .	$119
360	$124

CHRYSLER	
361	$147
383	$147
400	$164
440	$150
FORD	
144 / 170. . . .	$124
200	$126
240 / 300. . . .	$110
250	$118
159	$133
171 V6 2.8 . .	$135
177 2.9.	$211
183 3.0.	$202
230	$187
244	$251
255 V8	$137
260 V8	$117
289	$ 95
302 *(68-81)*. . .	$ 95
302 *(82-85)*. . .	$104
302 *(86-87)*. . .	$171
302 *(88-89)*. . .	$219
302 HO *(85)* . .	$122
302 HO *(86-87)* .	$171
302 HO *(87-91)* .	$196
351W *(69-83)* . .	$125
351W *(83-91)* . .	$131

FORD	
351C *(Dished / FT)*	$135
351M	$111
352	$152
360 / 390. . . .	$123
400	$111
428 / 428 *CJ/SCJ*	$135
429	$139
460 *(70-5/85)* . .	$139
460 *(6/85-2/86)*. .	$178
460 *(3/86-87)*. . .	$197
460 *(88-3/89)*. . .	$216
OLDSMOBILE	
330	$143
350	$133
260 V8	$158
400 *(68-69)*. . .	$193
403	$164
425 / 455. . . .	$146
PONTIAC	
326	$211
350	$154
389	$194
400	$155
428	$160
455	$163

DELUXE ENGINE REBUILD KITS

– Kit Includes –
- PISTON RINGS
- ROD BEARINGS
- MAIN BEARINGS
- OIL PUMP
- ENGINE GASKET SET
- TIMING CHAIN SET

From – $108.00 327/350 Chevy

AMC	
199/232/258 . .	$176
290	$189
304	$189
360	$190
343	$190
390/401	$219
BUICK	
231 V6 *(75-83)*.	$145
231 V6 *(Turbo) (75-83)*	$173
252	$169
350	$172
455	$208
CADILLAC	
472/500.	$274
CHEVROLET	
173 V6 *(80-84)*. .	$191
173 V6 *(85-91)*. .	$258
194 L6	$169
200 V6 *(78-79)* . .	$143
229 V6 *(80-84)* . .	$140
230 L6	$156
250 L6	$172
235 L6	$230
262 V6 *(85-86)*. .	$238
262 V6 *(87-91)*. .	$240
262 V8	$139

CHEVROLET	
265 V8	$149
267 V8	$136
283 V8	$133
292 L6	$198
305 *(75-80)*. . .	$115
305 *(81-85) ex. FI* .	$132
305 *(86-late)* . .	Phone
307 V8	$116
327 *(63-67)*. . .	$125
327 *(68-69)*. . .	$108
350 *(69-80)*. . .	$108
350 *(81-85) ex. FI* .	$123
350 *(86-late)* . .	Phone
396	$166
400 SB	$149
402 BB	$167
427	$167
454 *(71-79)*. . .	$167
454 *(80-85)*. . .	$177
454 *(86-90)*. . .	$183
CHRYSLER	
170/198/225 . .	$171
273	$166
318 *(69-late)* . .	$172
340 *(68-73)*. . .	$164
360	$169

CHRYSLER	
361	$198
383	$198
400	$215
440	$201
FORD	
144/170	$180
200	$182
240	$194
300	$207
250	$209
171 V6 2.8. . .	$224
177 2.9.	$330
183 3.0.	$325
230	$253
244	$329
255 V8	$182
260 V8	$162
289	$140
302 *(68-81)*. . .	$140
302 *(82-85)*. . .	$149
302 *(86-87)*. . .	$216
302 *(88-89)*. . .	$264
302 HO *(85)* . .	$167
302 HO *(86-4/15/87)*	$216
302 HO *(87-91)*. .	$241
351W *(69-83)* . .	$172
351W *(83-91)* . .	$178

FORD	
351C *(Dished)* . .	$181
351C *(Flat Top)*. .	$181
351M	$157
352	$198
360/390.	$169
400	$157
428/428 CJ-SCJ	$181
429	$165
460 *(70-5/85)*. . .	$185
460 *(6/85-2/86)* . .	$224
460 *(3/86-87)*. . .	$243
460 *(88-3/89)*. . .	$262
OLDSMOBILE	
330	$193
350	$183
260	$208
425/455.	$196
400 *(68-69)*. . .	$243
403	$214
PONTIAC	
326	$261
350	$204
389	$244
400	$205
428	$206
455	$214

OPTIONS AVAILABLE: Moly Rings / HV Oil Pump / Double Roller Timing Chain Set / Pistons available STD-030-040-060 / Bearings available STD-010-020-030

DELUXE MASTER REBUILD KITS

– Kit Includes –

- PISTONS *(Cast or TRW Forged)*
- SEALED POWER PISTONS RINGS
- ROD & MAIN BEARINGS
- PREMIUM ENGINE GASKET SET
- TIMING CHAIN SET WITH GEARS
- OIL PUMP
- CAMSHAFT & LIFTERS *(Solid, Stock, Hydraulic or Performance)*

AMC	CAST PISTON	FORGED PISTON
232/258 . . .	$406	–
304	$486	–
343	$509	–
360	$466	$748
390	$502	–
401	$552	$720
BUICK		
231 V6	$291	$505
231 V6 *(Turbo)*	$440	$591
252	$403	–
350	$543	$635
455	$581	$688
CADILLAC		
472	$840	–
500	$833	–
CHEVROLET		
173 V6 *(80-84)*	$394	$579
173 V6 *(85-91)*	$461	$646
194 L6	$396	–
200 V6 *(78-79)*	$346	–
229 V6 *(80-84)*	$275	$506
230 L6	$318	$438
235 L6	$577	–
250 L6	$314	$506
262 V6 *(85-86)*	$407	$486
262 V6 *(87-91)*	$596	$675
262 V8	$443	–
265 V8	$502	–
267 V8	$359	–
283 V8	$335	$495
292 L6	$410	$544
305 *(75-80)* . .	$274	$582
305 *(81-85) ex FI*	$309	$608
305 *(86-late)* . .	Phone	

CHEVY	CAST PISTON	FORGED PISTON
307 V8	$346	$573
327	$333	$466
350 *(68-80)* .	$266	$372
350 *(81-85) ex FI*	$281	$387
350 *(86-late)* . .	Phone	
396	$483	$520
400 SB	$430	$622
402 BB	$527	$686
427	$527	$543
454 *(71-79)* . .	$469	$584
454 *(80-85)* . .	$479	$594
454 *(86-90)* . .	$485	$600
CHRYSLER		
170/198/225.	$334	$554
273	$470	–
318 *(69-late)* . .	$350	$737
340 *(68-71)* . .	$476	$566
340 *(72-73)* . .	$454	$735
360	$364	$543
383	$546	$638
400	$577	$695
440	$586	$614
FORD		
144 6 Cyl. . .	$433	–
170	$416	–
200	$383	$720
240	$397	$591
250	$392	$729
300	$381	$521
171 V6 2.8 .	$444	–
177 2.9 . . .	$580	–
183 3.0 . . .	$523	–
230	$478	$602
255 V8	$407	–
260 V8	$423	–

FORD	CAST PISTON	FORGED PISTON
289	$302	$416
302 *(68-81)* . .	$302	$416
302 *(82-85)* . .	$311	$425
302 *(86-87)* . .	$434	$596
302 *(88-89)* . .	$482	$644
302 HO *(85)* .	$607	$857
302 HO *(86-87)*	$663	$906
302 HO *(87-91)*	$688	$931
351W *(69-83)* .	$367	$568
351W *(83-91)* .	$373	$574
351C *(Dished)* .	$449	$731
351C *(Flat Top)*	$435	$499
351M	$337	$725
352	$409	–
360	$380	$556
390	$380	$556
400	$357	$544
428	$465	$552
428 CJ / SCJ	–	$712
429	$482	$609
460 *(70-5/85)*. .	$409	$522
460 *(6/85-2/86)*.	$448	$561
460 *(3/86-87)*. .	$467	$580
460 *(88-3/89)*. .	$486	–
OLDSMOBILE		
260 V8	$455	–
350	$415	$646
403	$519	$749
455	$587	$633
PONTIAC		
326	$587	–
350	$523	$619
389	$570	$652
400	$473	$533
455	$569	$611

OPTIONS AVAILABLE: Moly Rings / HV Oil Pump / Double Roller Timing Chain Set / Pistons available STD-030-040-060 / Bearings available STD-010-020-030

Hi-Performance LONG SLOT ROCKER ARMS

SB CHEVY *(Set of 16)*	$39.84
BB CHEVY *(Set of 16)*	$60.00

Kit includes: Arms, Balls, Nuts.

Rhoads Lifters

- MORE TORQUE • MORE VACUUM
- BETTER ECONOMY • SMOOTHER IDLE

Most V8's As Low As $64.95

McLeod

Clutches, Flywheels & Bellhousings.

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PETE JACKSON GEAR DRIVES

As Low As $134.00

QUIET OR NOISY

Chevy SB	$134.00
Chevy BB	$159.00
Chevy 409.	$259.00
Chrysler 383-426-440 . .	$259.00
Ford 289-302-351W . . .	$229.00
Ford 351C.	$234.00
Ford 429-460	$359.00
Pontiac 326-389-400-455	$259.00

P A W STAINLESS STEEL VALVES

As Low As $6.50 ea.

CRANKSHAFT SPECIALS

350 CHEVY Cast Crankshaft

$80.00 *(Without Bearings)*

Outright – No exchange / *Others – Phone*

ORDER 7 DAYS A WEEK!

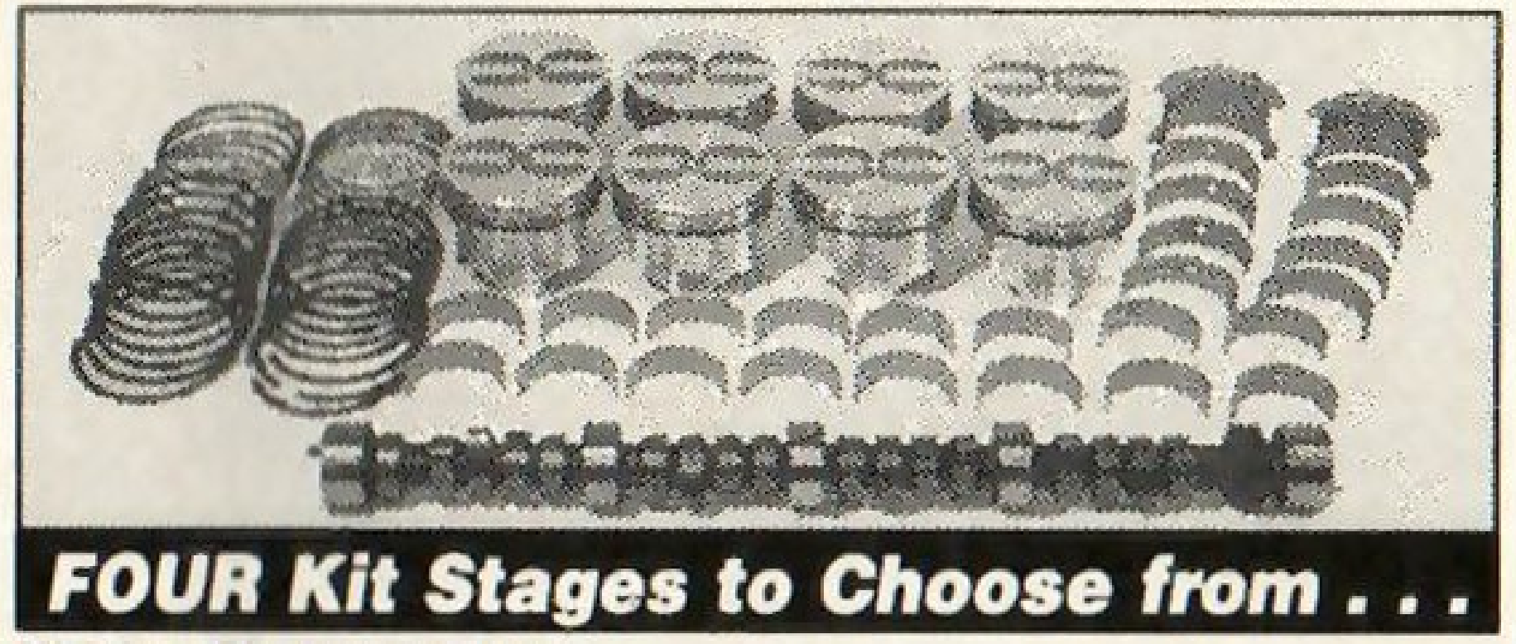
Phone Hours: Mon.–Fri. 6 am to 5:30 pm, Sat. & Sun. 8:30 am to 5:30 pm (PT)

➤PHONE: 818-998-6000 ➤FAX: 818-407-7204 (24 hrs/day)

CALIFORNIA RESIDENTS – SOME ITEMS IN THIS AD MAY NOT BE LEGAL FOR SALE OR USE ON POLLUTION CONTROLLED MOTOR VEHICLES IN CALIFORNIA; LEGAL ONLY FOR USE ON RACING VEHICLES, WHICH MAY NOT BE USED ON HIGHWAYS. CHECK STATE AND LOCAL LAWS BEFORE PURCHASING.

P.A.W. Supplies All Cores – Exchange Not Required. We Carry A Complete Line Of Stock Performance & Racing Engine Parts. If You Don't See It, Phone For Your Low Price!

SUPER STOCK PISTON KITS
With Cast or Forged Pistons



FOUR Kit Stages to Choose from . . .

KIT A = *Pistons & Pins*
KIT B = *Pistons & Pins • Piston Ring Set*
KIT C = *Pistons & Pins • Piston Ring Set • Con Rod Bearings & Main Bearings*
KIT D = *Pistons & Pins • Piston Ring Set • Con Rod Bearings & Main Bearings • Stock or Performance Camshaft*

Make / Size	CAST PISTONS KITS A	B	C	D	FORGED PISTON KITS A	B	C	D
AMC								
232 / 258 6 Cyl	$124	$155	$214	$293	–	–	–	–
304	$216	$249	$325	$370	–	–	–	–
343	$238	$272	$348	$393	–	–	–	–
360	$195	$229	$305	$350	$477	$511	$587	$632
390	$202	$240	$341	$386	–	–	–	–
401	$252	$290	$391	$436	$420	$458	$559	$604
BUICK								
231 V6	$ 74	$ 98	$146	$191	$288	$312	$360	$405
231 V6 *(Turbo)*	$195	$258	$306	$351	$346	$409	$457	$502
252	$162	$203	$251	$296	–	–	–	–
350	$231	$263	$340	$422	$323	$355	$432	$514
455	$252	$295	$388	$473	$359	$402	$495	$580
CADILLAC								
472	$382	$424	$525	$673	–	–	–	–
500	$375	$417	$518	$666	–	–	–	–
CHEVROLET								
173 V6 *(80-84)*	$114	$160	$201	$246	$299	$345	$386	$431
173 V6 *(85-91)*	$114	$160	$199	$244	$299	$345	$384	$429
194 L6 *(85-91)*	$157	$199	$254	$299	–	–	–	–
200 V6 *(78-79)*	$108	$134	$186	$256	–	–	–	–
229 V6 *(80-84)*	$ 60	$ 89	$141	$191	$291	$320	$372	$422
230 L6	$ 92	$121	$176	$221	$212	$241	$296	$341
235 L6	$130	$165	$242	$322	–	–	–	–
250 L6	$ 72	$101	$156	$201	$264	$293	$348	$393
262 V6 *(4.3) (85-86)*	$ 60	$117	$169	$253	$139	$196	$248	$332
262 V6 *(4.3) (87-91)*	$ 60	$117	$169	$380	$139	$196	$248	$459
262 V8	$225	$279	$317	$362	–	–	–	–
265 V8	$274	$307	$362	$407	–	–	–	–
267 V8	$144	$178	$216	$261	–	–	–	–
283 V8	$123	$155	$210	$255	$283	$315	$370	$415
292 L6	$124	$152	$203	$266	$258	$286	$337	$400
305 *(75-86)*	$ 80	$110	$148	$193	$388	$418	$456	$501
305 *(87-91)* . . . **From**	$ 98	$128	$166	$211	$397	$427	$465	$510
307 V8	$151	$183	$221	$266	$378	$410	$448	$493
327 *(63-67)*	$129	$153	$208	$253	$262	$286	$341	$386
350 *(68-86)*	$ 79	$103	$141	$186	$185	$209	$247	$292
350 Truck *(87-91)*	$ 79	$103	$141	$186	$185	$209	$247	$292
350 Pass. *(87-91)*	$ 79	$103	$141	$321	$185	$209	$247	$427
396	$238	$271	$326	$371	$275	$308	$363	$408
400 SB	$202	$236	$292	$337	$394	$428	$484	$529
402 BB	$281	$315	$370	$415	$440	$474	$529	$574
427	$281	$315	$370	$415	$297	$331	$386	$431
454 *(71-90)*	$223	$257	$312	$357	$338	$372	$427	$472
CHRYSLER								
170 / 198 / 225	$ 70	$ 95	$152	$218	$290	$315	$372	$438
273	$223	$259	$315	$360	–	–	–	–
318 *(68-late)*	$ 97	$130	$195	$240	$484	$517	$582	$627
340 *(68-71)*	$231	$265	$321	$366	$321	$355	$411	$456
340 *(72-73)*	$209	$243	$299	$344	$490	$524	$580	$625
360	$114	$138	$209	$254	$293	$317	$388	$433
383	$267	$301	$384	$429	$359	$393	$476	$521
400	$281	$332	$415	$460	$399	$450	$533	$578
440	$304	$340	$424	$469	$332	$368	$452	$497
FORD								
144	$141	$167	$238	$323	–	–	–	–
170	$124	$150	$221	$306	–	–	–	–
200	$ 89	$114	$166	$273	$426	$451	$525	$610
240	$119	$143	$202	$259	$313	$337	$396	$453
250	$ 89	$114	$175	$242	$426	$451	$512	$579
300	$ 90	$114	$173	$230	$230	$254	$313	$370
171 V6 *(2.8)*	$110	$140	$193	$276	–	–	–	–
177 *(2.9)*	$130	$189	$269	$362	–	–	–	–
183 *(3.0)*	$ 97	$153	$204	$278	–	–	–	–
230	$124	$171	$235	$309	$248	$295	$359	$433
255 V8	$144	$197	$241	$286	–	–	–	–
260 V8	$180	$226	$270	$315	–	–	–	–
289 / 302 *(68-85)*	$ 81	$105	$149	$194	$195	$219	$263	$308
302 *(86-89)*	$137	$210	$254	$299	$299	$372	$416	$461
302 H.O. *(85)*	$ 87	$111	$155	$409	$337	$361	$405	$659
302 H.O. *(86-91)*	$ 94	$167	$211	$465	$337	$410	$454	$708
351W *(69-91)*	$114	$138	$194	$239	$315	$339	$395	$440
351C *(Dished)*	$187	$211	$291	$336	$469	$493	$573	$618
351C *(Flat Top)*	$173	$197	$277	$322	$237	$261	$341	$386
351M	$ 99	$123	$179	$224	$487	$511	$567	$612
352	$130	$166	$255	$300	–	–	–	–
360	$130	$161	$226	$271	$306	$337	$402	$447
390	$130	$161	$226	$271	$306	$337	$402	$447
400	$119	$143	$199	$244	$306	$330	$386	$431
428	$223	$266	$331	$376	$290	$333	$398	$443
428 CJ / SCJ	–	–	–	–	$450	$493	$558	$603
429	$216	$254	$319	$364	$343	$361	$446	$491
460 *(70-87)*	$143	$181	$246	$291	$256	$294	$359	$404
460 *(88-3/89)*	$143	$181	$246	$291	–	–	–	–
OLDSMOBILE								
260 V8	$166	$200	$269	$314	–	–	–	–
350	$151	$185	$254	$299	$382	$416	$485	$530
403	$224	$274	$343	$388	$454	$504	$573	$618
455	$310	$344	$426	$471	$356	$390	$472	$517
PONTIAC								
301	$137	$174	$245	$290	$436	$473	$544	$589
326	$245	$315	$402	$447	–	–	–	–
350	$238	$270	$357	$402	$334	$366	$453	$498
389	$245	$298	$385	$430	$327	$360	$467	$512
400	$187	$220	$307	$352	$247	$280	$367	$412
455	$274	$310	$402	$447	$316	$352	$444	$489

Pistons available in all popular sizes and stock compression ratios – State size and Connecting Rod and Main Bearing sizes, if not standard. Camshafts are available from the listing in High Performance Camshaft section or stock camshaft will be substituted. • For Lifters & Springs – *PHONE for PRICE.* • For Moly Rings – *Add* $16.95. • For substitution of cam with any Isky, Crane, Crower, Competition Cams, etc. • *PHONE for PRICE.*

ON SALE

TCI TORQUE CONVERTERS

SATURDAY NIGHT SPECIAL

400 to 600 RPM over stock stall speed. T350 & T400 only.

#TCI-241500
$116.95

11" BREAK-AWAY

1,000 RPM over stock stall speed. T350 & T400 only.
#TCI-240900 . . . . **$199.95**

CROWER HYDRAULIC RACING COMPU-PRO Cams

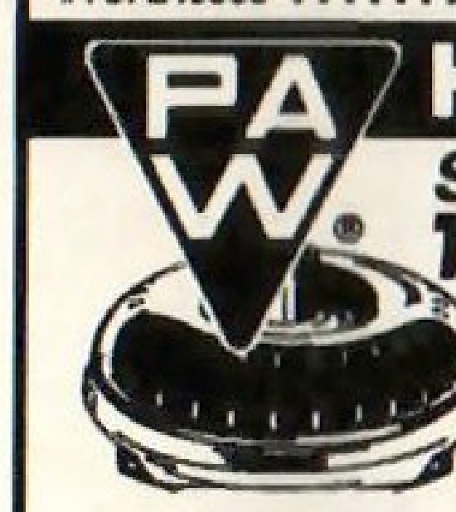
Your Low Price From **$96.95** Camshaft Only

FLEX FANS
- 6 BLADE -

Stainless Steel
13", 15", 17" or 18" . . . **$14.95**

Hi-Perf./HD Stainless Steel
13", 15", 17" or 18" . . **$28.95**

P.A.W. HI-STALL CONVERTERS



STREETROD / SUPER STREET TORQUE CONVERTERS SPECIAL

Especially designed for 500-600 RPM over stock stall speed, for quick response and acceleration from idle.
TURBO 350-400 . . . **$84.95**

11" HI-STALL 2800 RPM CONVERTER

Designed for street and street strip applications and good horsepower engines.
TURBO 350-400 . . **$139.95**

HEAVY DUTY-RV-TOWING MILEAGE CONVERTER

Less slippage, more torque, lower operating temperature, longer translife. Ideal for trucks, vans, motorhomes and street applications.
TURBO 350-400 . . . . . **$84.95**

SUPER STOCK CRANK KITS

Kit Includes:

- *PISTONS & PINS*
- *PISTON RINGS*
- *CONNECTING RODS*
- *ROD & MAIN BEARINGS*
- *CRANKSHAFT*

AMC	CAST PISTON	FORGED PISTON
232/258	$404	–
304	$585	–
343	$608	–
360	$565	$847
390	$821	–
401	$871	$1039
BUICK		
231 V6	$360	$574
231 V6 *(Turbo)*	$520	$671
252	$465	–
350	$550	$642
455	$598	$705
CADILLAC		
472	$745	–
500	$738	–
CHEVROLET		
173 V6 *(80-84)*	$493	$678
173 V6 *(85-91)*	$491	$676
194 L6	$444	–
200 V6 *(78-79)*	$428	–
229 V6 *(80-84)*	$383	$614
230 L6	$366	$486
235 L6	$432	–
250 L6	$346	$538
262 V6 *(4.3)*	$461	$540
262 V8	$515	–
265 V8	$626	–
267 V8	$394	–
283 V8	$474*	$634*
292 L6	$433	$567
305 *(75-85)*	$326	$634
305 *(85-86) ex. Fl.*	$406	$714
305 *(87-91)*	$424	$723

CHEVY	CAST PISTON	FORGED PISTON
307 V8	$399	$626
327	$512*	$645*
350 *(68-85)*	$319	$425
350 *(86-91)*	$399	$505
396	$692*	$729*
400 SB	$643*	$835*
402 BB	$736*	$895*
427	$736*	$752*
454 *(71-90)*	$758*	$873*
CHRYSLER		
170/198/225	$342	$562
273	$605	–
318 *(68-72)*	$485	$872
318 *(73-late)*	$405	$792
340 *(68-71)*	$611	$701
340 *(72-73)*	$589	$870
360	$419	$598
383	$604	$696
400	$635	$753
440	$760*	$788*
FORD		
144 6 Cyl.	$428	–
170	$411	–
200	$378	$715
240	$416	$610
250	$365	$702
300	$469	$609
171 V6 *(2.8)*	$423	–
177 *(2.9)*	$529	–
183 *(3.0)*	$304	–
255 V8	$489	–
260 V8	$522	–
289	$441	$555

FORD	CAST PISTON	FORGED PISTON
302 *(68-81)*	$327	$441
302 *(82-85)*	$377	$491
302 *(86-89)*	$482	$644
302 HO *(85)*	$383	$633
302 HO *(86-91)*	$439	$682
351W *(69-91)*	$434	$635
351C *(Dished)*	$501	$783
351C *(Flat Top)*	$487	$551
351M	$439	$827
352	$587	–
360	$558*	$734*
390	$618*	$794*
400	$419	$606
428	$863*	$930*
428 CJ / SCJ	–	$1090
429	$539	$666
460 *(70-78)*	$466	$579
460 *(79-87)*	$576	$689
460 *(88-3/89)*	$576	–
OLDSMOBILE		
260 V8	$489	–
350	$474	$705
403	$565	$795
455	$686	$732
PONTIAC		
326	$622	–
350	$577	$673
389	$645	$727
400	$527	$587
455	$772	$814

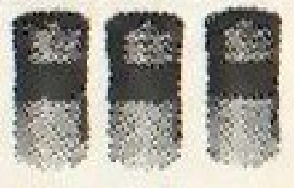
Pistons available in all popular sizes and stock compression ratios – State piston size required.
- For Moly Rings – *Add* $16.95 • *SPECIAL OPTION:* For Custom Balancing + Press Pistons to Rods or Hone Rods for Floating Pins, as required – *Add* $120.00
- *Crankshafts* – Steel crankshafts available as options for Chevy 327 large journal, 350-396-427 & 454, Olds 330-455 and Chrysler 340 & 440 for additional charge – *PHONE for PRICE.*

* These kits *ONLY* available with Chrome Moly Rod Bolts – *Add* $60.00

HIGH VOLUME OIL PUMPS

20% more volume than stock pump.
From **$19.00** *For All Popular SB CHEVY Engines.*
Also available for: Ford, Pontiac & Chrysler.

PERFORMANCE LIFTERS
SOLID/HYDRAULIC



SB Chevy	Most Others
$36.96	$39.84

BEARING SPECIAL

-Rod Bearings-
Available STD - 010 - 020 - 030

-Main Bearings-
Available STD - 010 - 020 - 030

Both From **$41.95** SB Chevy *Only*

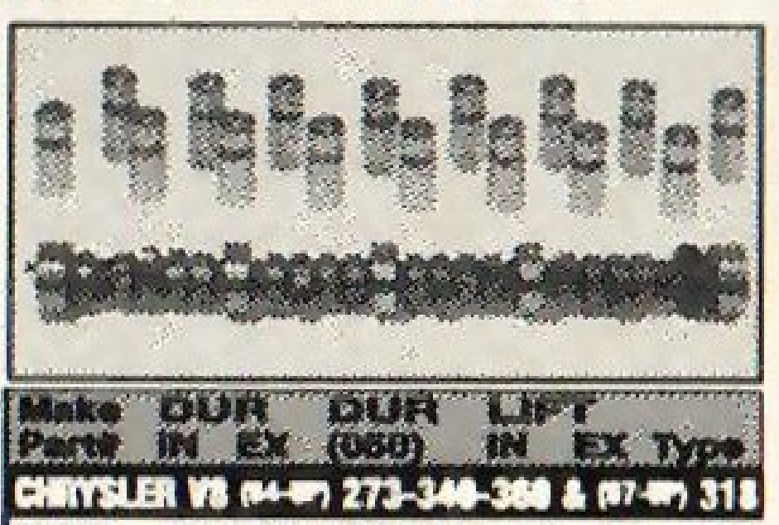
AVAILABLE FOR MOST DOMESTIC 6 CYL. & V8 ENGINES

- Cam Bearings . . *Add From* $13.95
- Others . *Phone for Your Low Price*

CAMSHAFT SPECIAL

P.A.W. PERFORMANCE HYDRAULIC & SOLID LIFTER CAMSHAFTS
S.I.S. SUPER STOCK INDUSTRIES

As Low As . . . **$44.95** *SB Chevy*

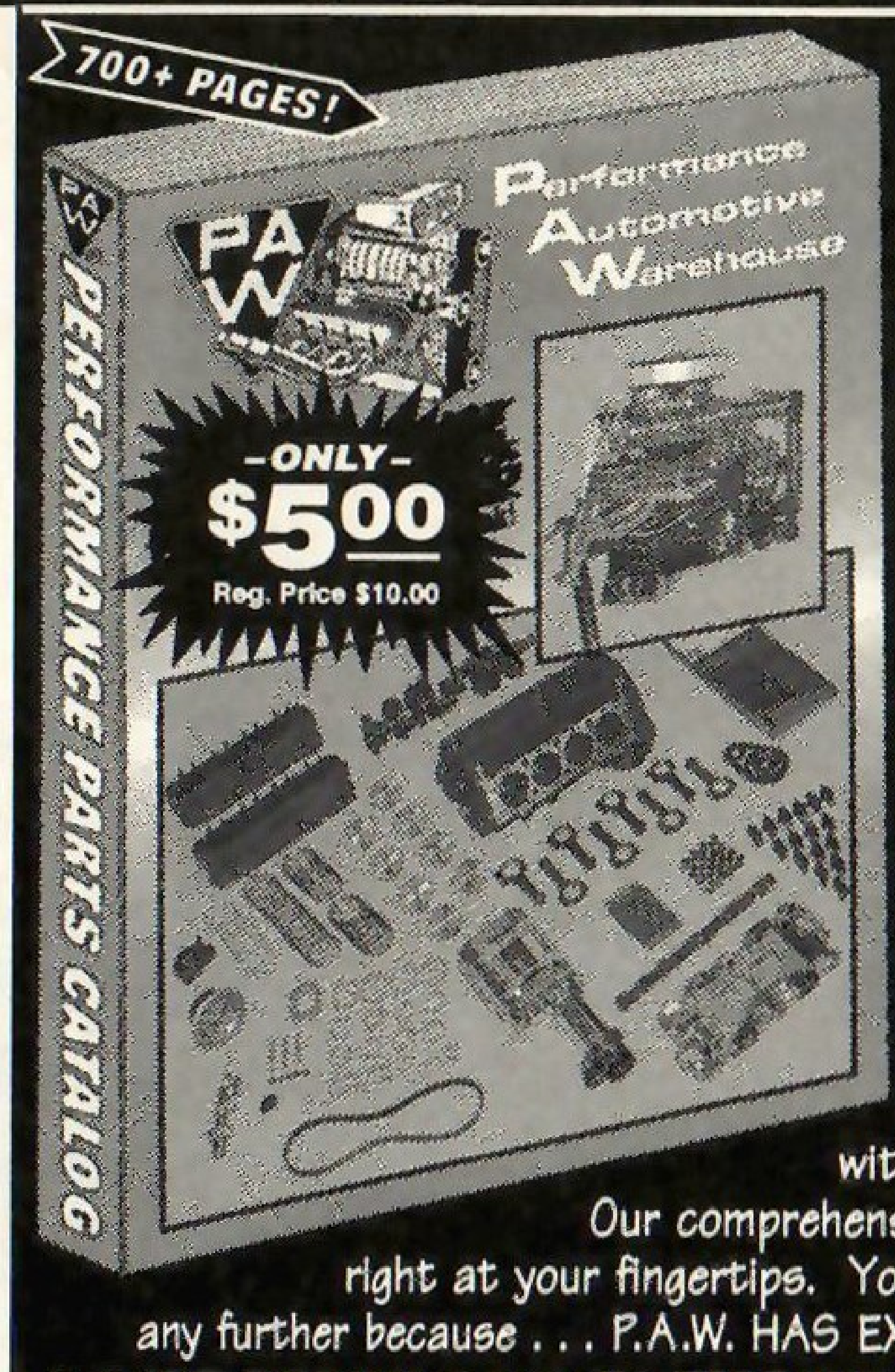


KIT
- **A** **CAMSHAFT** (SB Chevy) . . . . . **$44.95** / *Others* $49.95
- **B** **CAM & LIFTERS** (SB Chevy) . . . . . **$79.95** / *Others* $84.95
- **C** **CAM, LIFTERS & SPRINGS** . . . . ***Phone***

Make Part#	DUR IN	DUR EX	DUR (050) IN	DUR (050) EX	LIFT IN	LIFT EX	Type
AMC V8 (66-87) 290-304-343-360-390-401							
10301	272	282	214	224	.472	.496	HYD
10302	282	292	224	234	.496	.521	HYD
BUICK V6 (Even Fire 78-87) 181-196-231-252							
10303	262	272	204	214	.448	.472	HYD
10304	272	282	214	224	.472	.496	HYD
CHEVY 60° V6 (80-87) 173							
10305	262	272	204	214	.420	.422	HYD
10361	280	290	214	244	.443	.465	HYD
CHEVY 90° V6 (78-87) 200-229							
10306	262	272	204	214	.420	.442	HYD
CHEVY 6 CYL (62-84) 194-230-250							
10348	308	308	224	224	.509	.509	HYD
CHEVY V8 (57-87) 262-267-283-302-305-307-327-350-400							
10307	242	252	184	194	.368	.398	HYD
10308	252	262	194	204	.398	.420	HYD
10309	262	272	204	214	.420	.442	HYD
10310	272	282	214	224	.442	.465	HYD
10311	282	282	224	224	.465	.465	HYD
10338	284	284	230	230	.450	.450	HYD
10312	282	292	224	234	.465	.488	HYD
10339	288	288	230	230	.480	.480	HYD
10313	292	292	234	234	.488	.488	HYD
10314	282	302	234	244	.488	.510	HYD
10340	300	300	246	246	.500	.500	HYD
10315	302	312	244	254	.510	.533	HYD
10316	312	322	254	264	.533	.555	HYD
10341	264	264	246	246	.471	.471	SLD
10342	277	277	316	316	.488	.488	SLD
10343	312	312	272	272	.558	.558	SLD
CHEVROLET V8 (67-87) 396-402-427-454							
10317	266	276	208	218	.475	.500	HYD
10362	280	290	204	214	.476	.501	HYD
10318	276	286	218	228	.500	.500	HYD
10344	309	327	221	235	.500	.506	HYD
10319	286	296	228	238	.540	.540	HYD
10320	296	306	238	248	.540	.540	HYD
10345	291	299	252	262	.534	.532	SLD
10346	325	325	262	273	.561	.600	SLD
10347	328	334	264	270	.541	.561	SLD

Make Part#	DUR IN	DUR EX	DUR (050) IN	DUR (050) EX	LIFT IN	LIFT EX	Type
CHRYSLER V8 (64-87) 273-340-360 & (67-87) 318							
10321	262	272	204	214	.420	.422	HYD
10322	276	286	218	228	.441	.441	HYD
10357	304	304	225	225	.454	.454	HYD
10358	298	298	243	243	.508	.508	HYD
10359	294	294	253	253	.469	.469	SLD
CHRYSLER V8 (58-78) 350-361-383-400-413-426-440							
10323	272	282	214	224	.442	.465	HYD
10324	282	292	224	234	.465	.488	HYD
FORD V8 (62-87) 221-255-260-289-302							
10325	262	272	204	214	.448	.472	HYD
10349	304	304	224	224	.465	.465	HYD
10326	276	286	218	228	.471	.471	HYD
10327	292	302	234	244	.520	.544	HYD
10350	287	287	230	230	.512	.512	HYD
10351	260	260	228	228	.459	.459	SLD
10352	304	304	252	252	.509	.509	SLD
10353	280	280	246	246	.504	.504	SLD
FORD V8 (69-82) 351W & (82-85) 302 H.O.							
10328	262	272	204	214	.448	.472	HYD
FORD V8 (70-82) 351C-351M-400							
10329	262	272	204	214	.484	.510	HYD
10330	276	286	218	228	.509	.509	HYD
10354	291	297	224	232	.503	.514	HYD
FORD V8 (63-76) 330-352-361-390-427-428							
10364	270	280	204	214	.484	.510	HYD
10355	314	314	223	223	.513	.513	HYD
10356	292	292	244	244	.506	.506	SLD
FORD V8 (68-87) 370-429-460							
10331	262	272	204	214	.479	.504	HYD
10363	270	280	204	214	.490	.516	HYD
10332	276	286	218	228	.503	.503	HYD
10337	292	302	234	244	.556	.581	HYD
OLDSMOBILE V8 (67-87) 260-307-350-400-403-425-455							
10333	262	272	204	214	.448	.472	HYD
10334	272	282	214	224	.472	.496	HYD
PONTIAC V8 (55-81) 265-287-301-316-326-347-350-389-400-421-428-455							
10335	262	272	204	214	.420	.442	HYD
10336	272	282	214	224	.442	.465	HYD
10360	282	282	246	246	.480	.480	HYD

- *SLD = Solid lifter camshafts*
- *HYD = Hydraulic lifter camshafts*



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whole bunch of the little buggers, for a very long time. And we discovered that nothing in the installation operation is out of the reach of the competent DIY mechanics with the proper tools.

In addition to the common hand tools, one would need the capability to remove and install press-fit bearings; a dial indicator; calipers or a micrometer; and a torque wrench that can accurately measure in the inch-pound range for setting the pinion-bearing preload. Throw in the specific RPS installation kit for the project and the aforementioned highly detailed installation instructions, and changing gear ratios and/or installing a locking or limited-slip carrier can be done wherever and whenever one would choose.

Of course, in addition to trying to find out how to set things up right, we were also keenly interested in finding out how to make things go wrong. What we were told was that, if high-quality parts and oil are used and if all tolerances, specs and patterns are right where they should be, about the only thing that can render all of the above null and void is if the driver of the freshly worked-on car doesn't follow the correct break-in procedure, and follow it to the letter.

We'll let Randy tell this particular tale. "The main thing we're trying to avoid is excessive heat," he said. "All new ring-and-pinion gearsets will run really hot, really quick, and the heat kills the gears more than anything."

During its initial use, the gearset is actually being work-hardened. The gears are cut with a metal cutting tool, they're not ground, so they don't have a real fine finish. They have rough edges that need to be knocked down, and when you work the two metal surfaces against each other, just like with a forging or a rolling process, it work-hardens the surface.

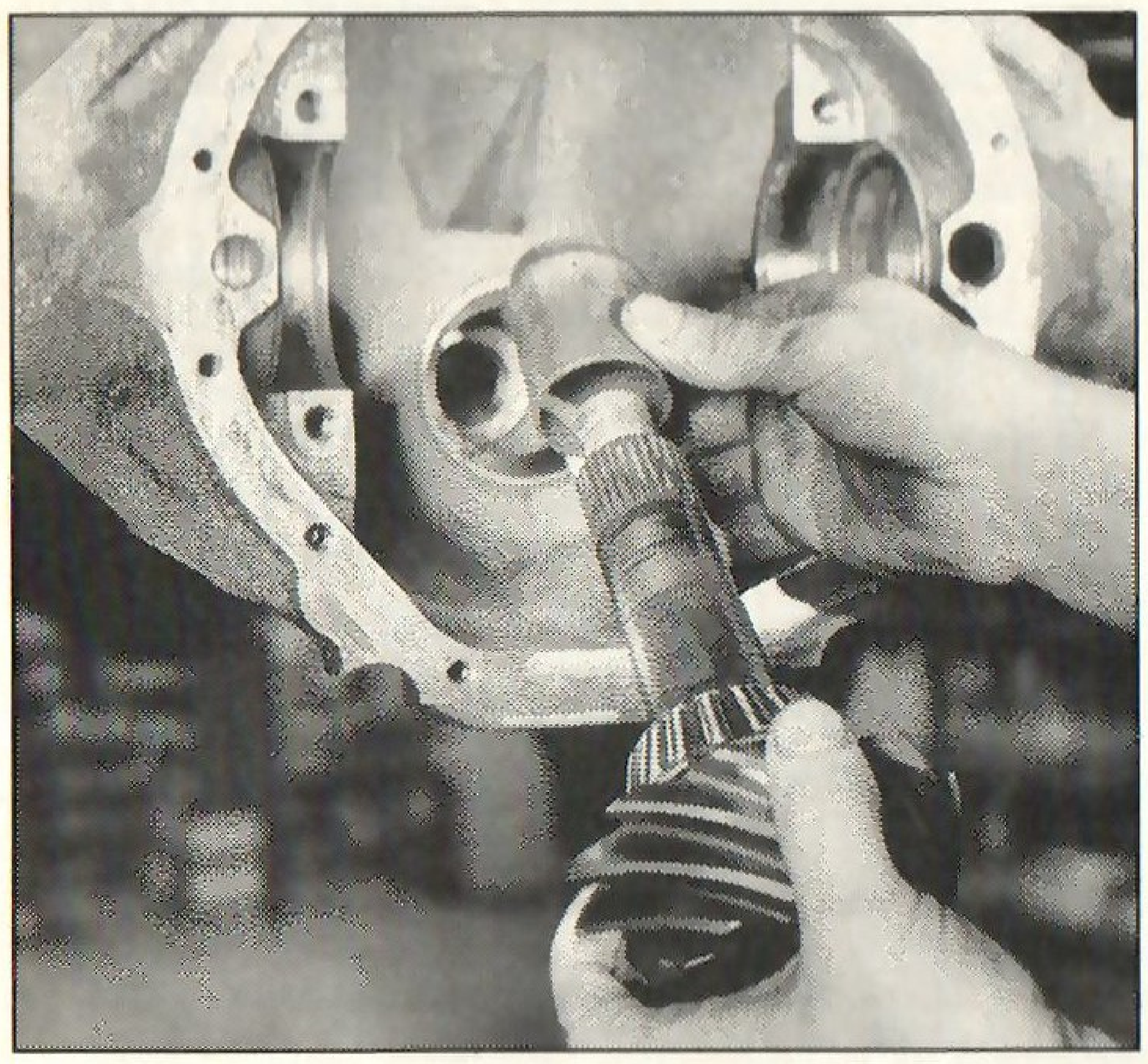
"Once that happens it'll take a load, but when it's fresh metal, and it's not work-hardened, and it still has rough edges, it just generates the heat that breaks down the oil. And when the oil breaks down during driving, the gear is wiped out."

This can be avoided by keeping the speed down and stopping after driving for 15-20 miles and letting the oil cool down completely before continuing on. Randy recommends that the prudent folks among us do this two or three times, to make sure everything is well-seated.

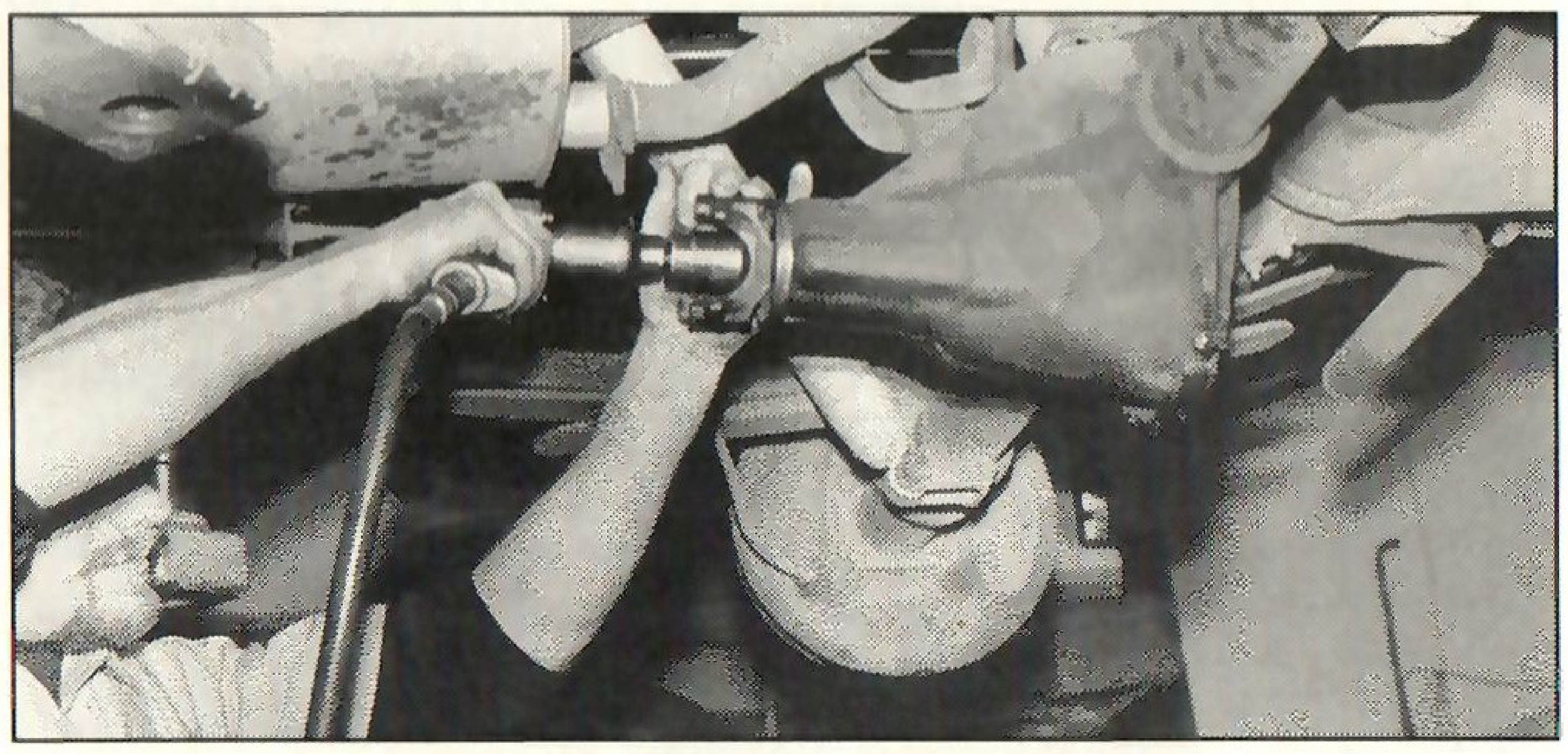
"Unfortunately," he continues, "what often happens is that the guy drives it calmly down the street for 20 or 30 miles, and thinks, okay, the break-in period is over," and he jumps on the throttle to see what his new gear ratio feels like. But what is actually happening is that the oil temperature is already really high, and when he applies the power the oil in contact with the gears can easily get up to around 280-300 degrees. It breaks down, and there go the gears.

"What's ideal is to keep the temperature of the teeth themselves below the breaking point of the oil. The first 10-15 minutes is enough to get the temperature up to where it will generally be. But as soon as you start to apply some power, you're transmitting that power through

(Continued on page 44)

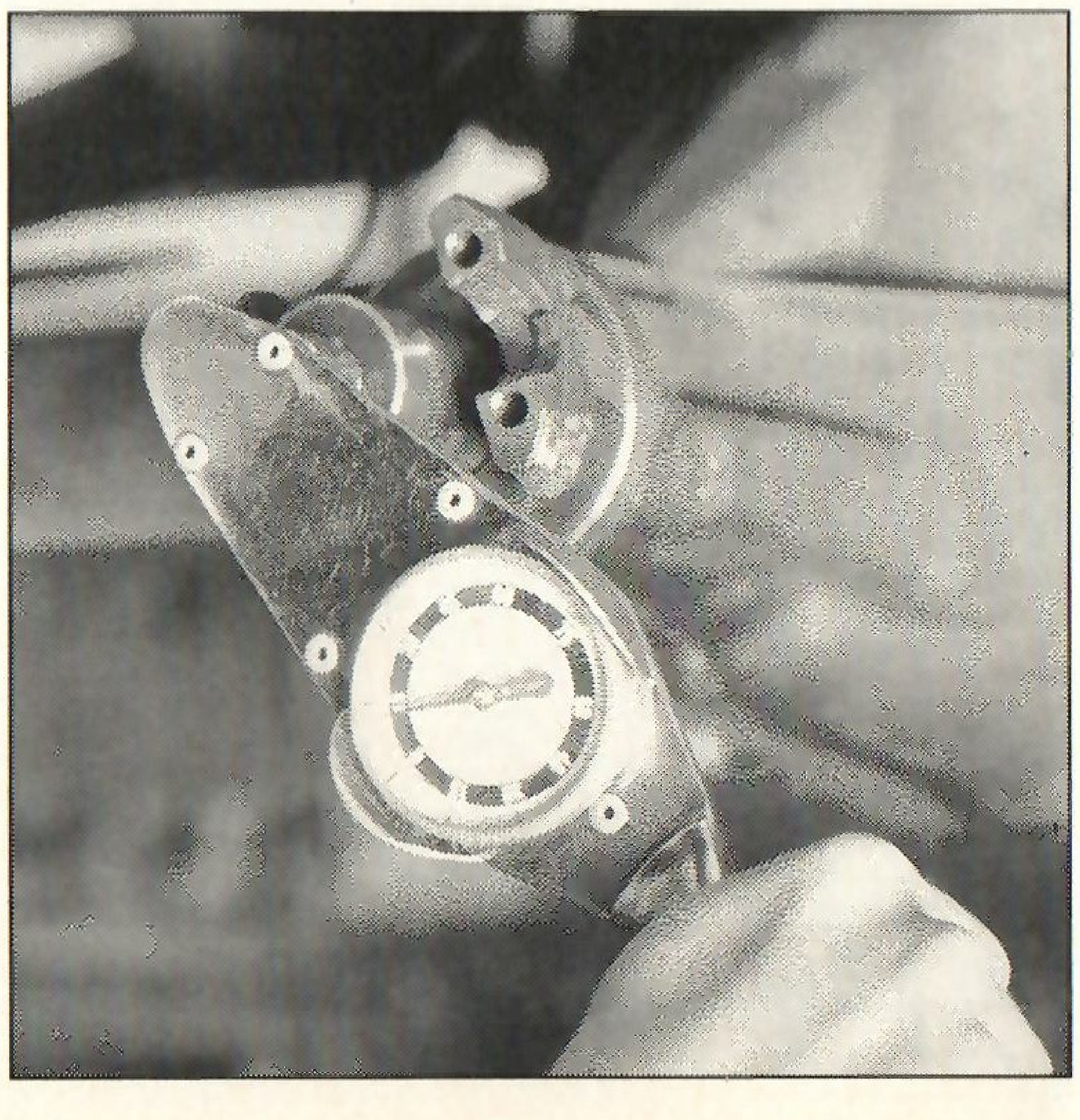


The bearing on the pinion shaft is also coated with oil; the crush sleeve is dropped into place on the shaft, which is then installed in the housing.



Although it is possible that very long breaker bars can be used to generate enough force to make the crush sleeve follow its destiny, a fairly powerful air gun makes the process much less of an ordeal. Be careful not to over-tighten the nut, as doing so means it's time to reverse your progress and install another new crush sleeve.

While holding the pinion in place, Chris drives the pinion yoke onto the end of the shaft.



This is where an accurate inch-pound torque wrench is a necessity. Setting the proper, specified pinion-bearing preload is absolutely critical and should never be guesstimated, under penalty of some major, best-to-be-avoided problems.

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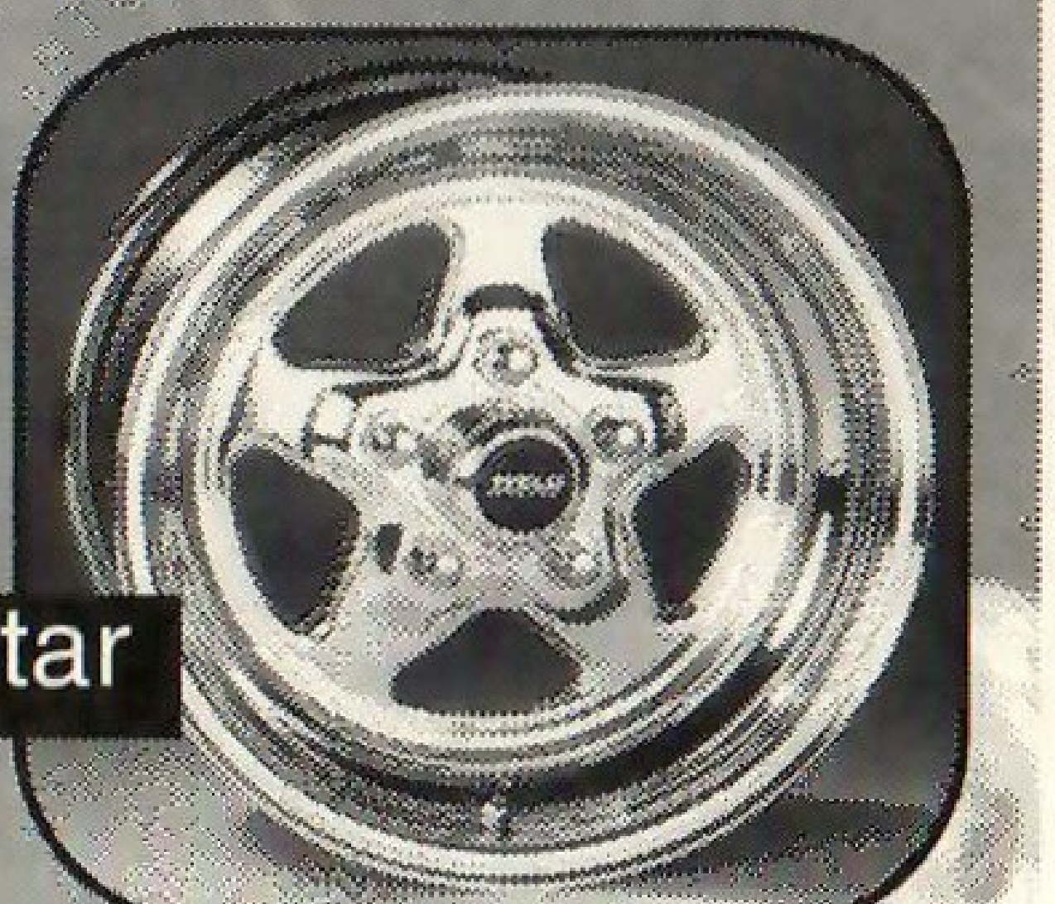

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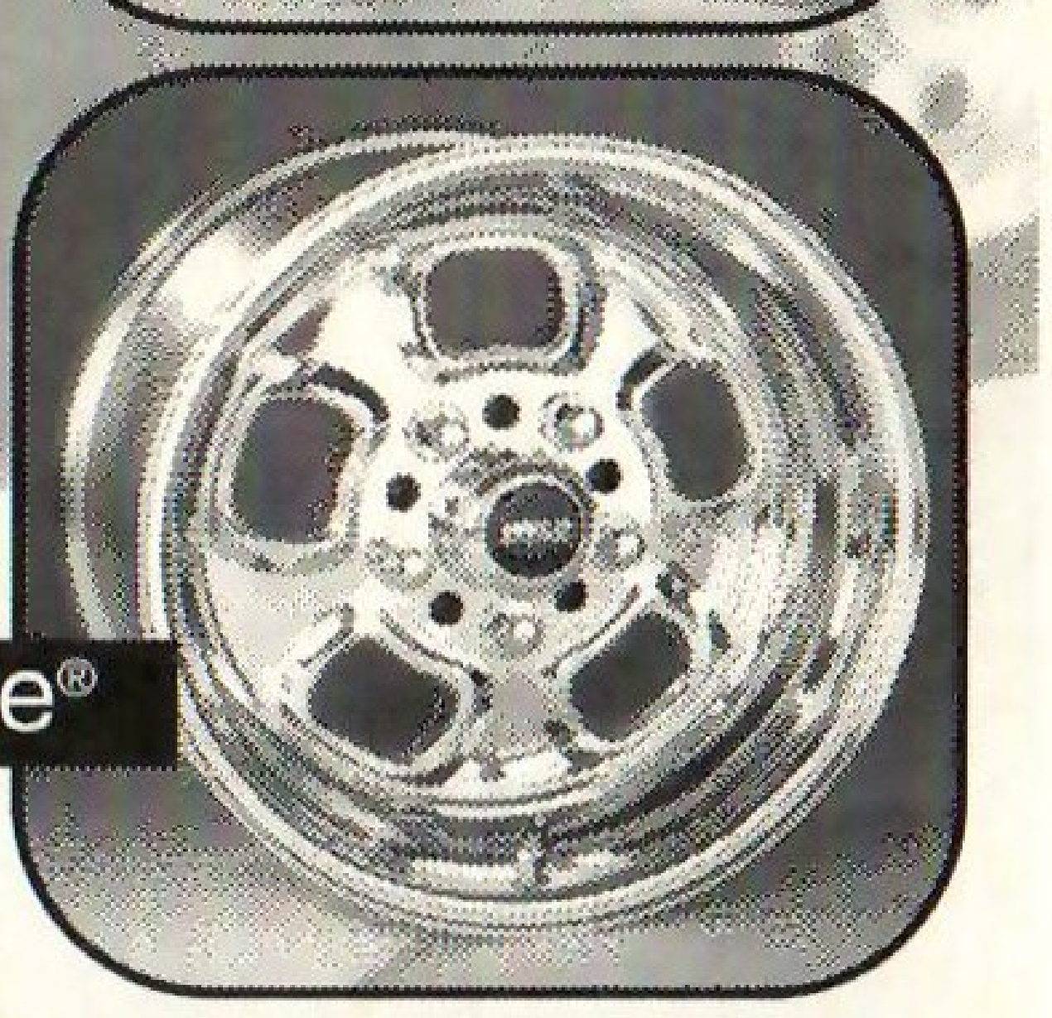

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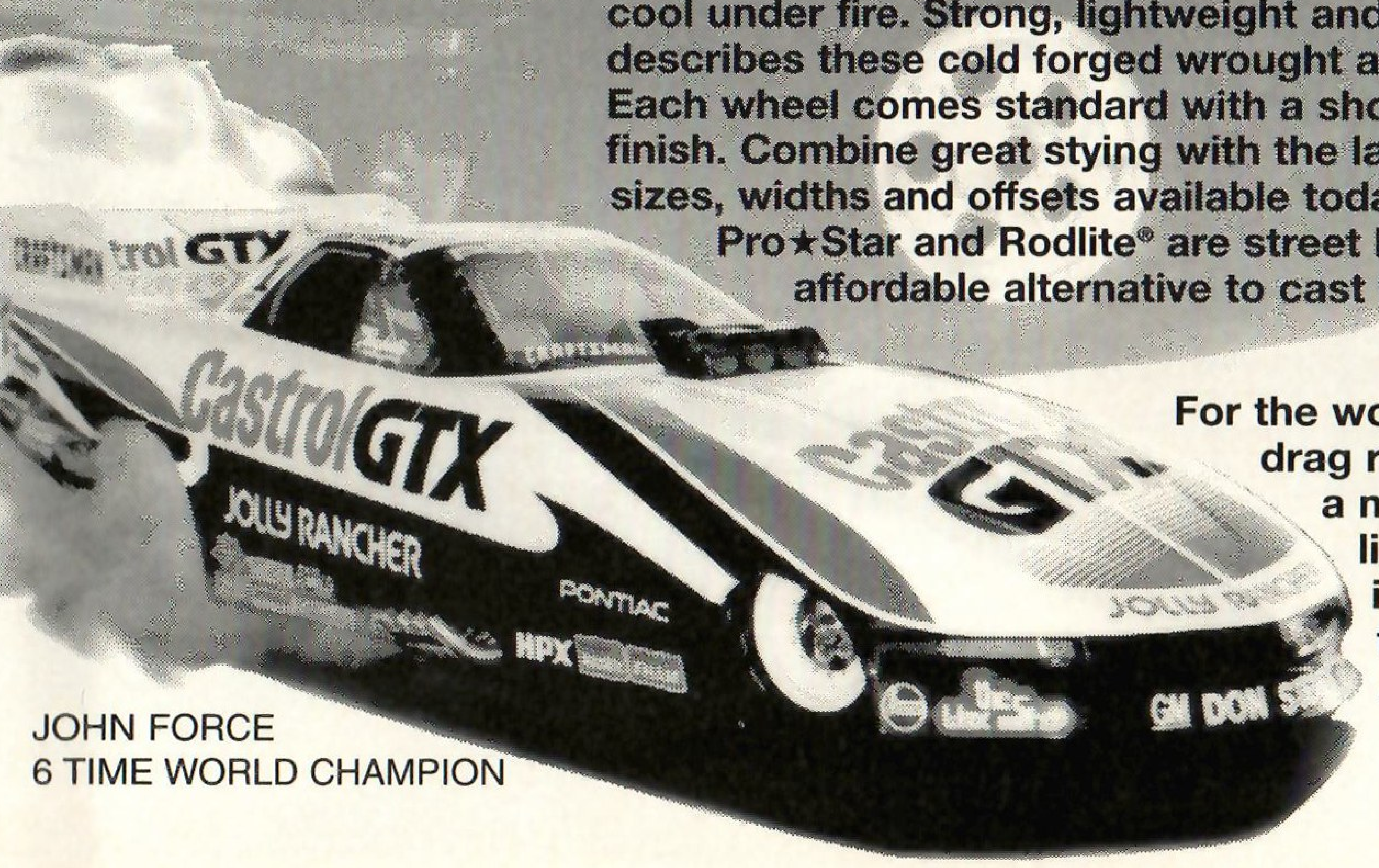

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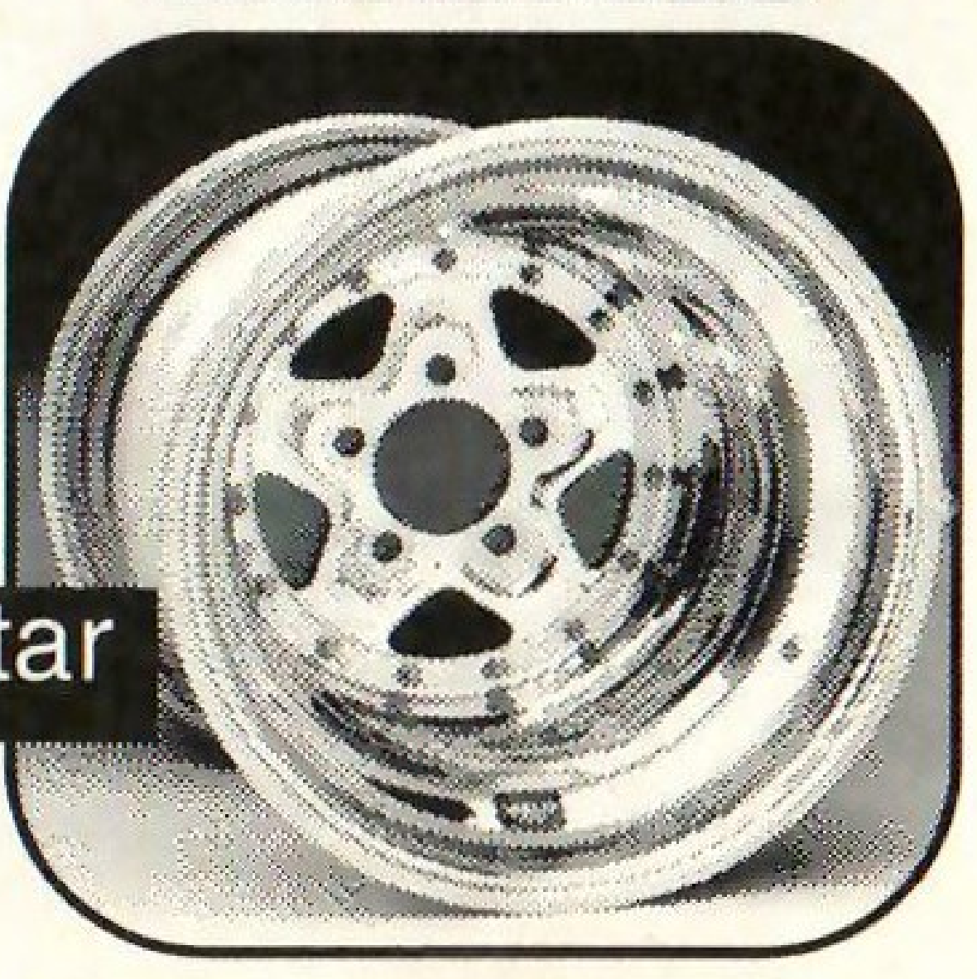


Aluma★Star

(Continued from page 42)

those rough, heated friction surfaces and it all just gets too hot."

For those who have racing in mind, Randy suggests putting at least 100 miles of normal driving onto the gears before doing any burnouts and getting into the serious "exhibition of speed" activities. And if the new gears find themselves in a vehicle used for towing, the demands are even more severe: a normal break-in procedure, then driving under sedate conditions for at least 500 miles before hooking anything to the trailer hitch. Once a trailer is in place, the requirement is that it only be towed for a very short distance, like less than 15 miles, before stopping and letting the differential cool down. After this process is repeated a couple more times, the gearset can be declared fully broken-in and the towing may begin in earnest.

Another recommended step is to change the oil after the first 500 miles of use for any new ring and pinion, as both metal particles and remnants of the phosphorus coating on the new gears will undoubtedly be present (and thinking about causing some mischief).

All of this talk about driving for the specified distances brought up another question: What about race cars?

"Again," Randy said, "the main thing we're trying to avoid is heat. If a person goes out and drag races a gear right away for a short period of time, say anywhere from 6 and 12 seconds, it won't build up much heat and it won't damage the gear."

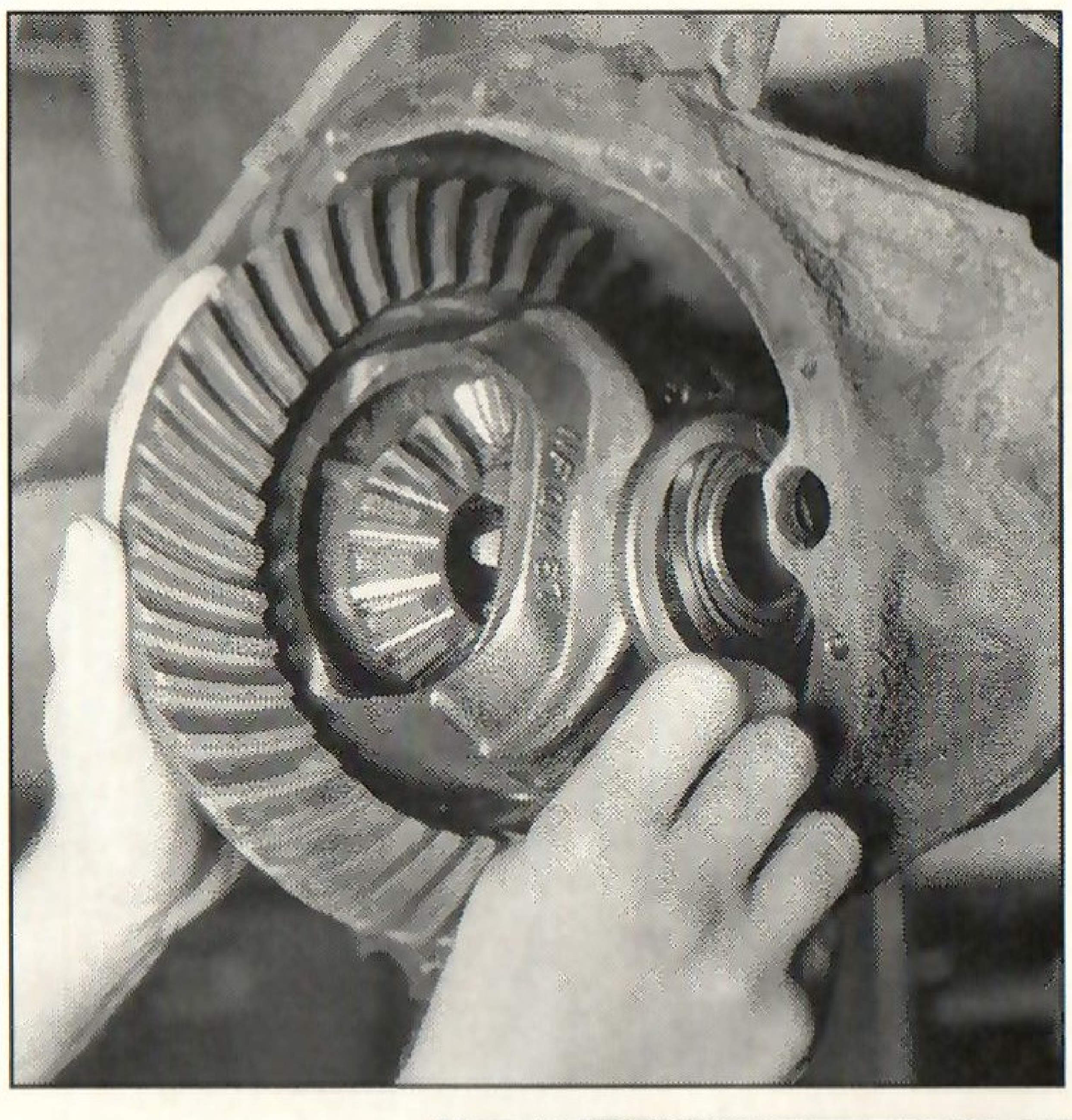
"Circle-track cars present a bigger problem, because you can't go get miles on a circle-track car. You can't drive it down the street, and it's hard to do enough hot-laps to really break it in. Plus, they go fast and turn left; the ring gear is on the left and the oil sloshes to the right, and when you're trying to cool the left-side ring gear with oil on the right side of the car it doesn't work."

"Ideally, they should just go out and make a few hot-laps, and then come back and shut it down and let it cool. Even if they go out and hammer the throttle for three or four laps and shut it down, that'd be fine. The trick is to let it cool completely, and then go out and do it again another time or two."

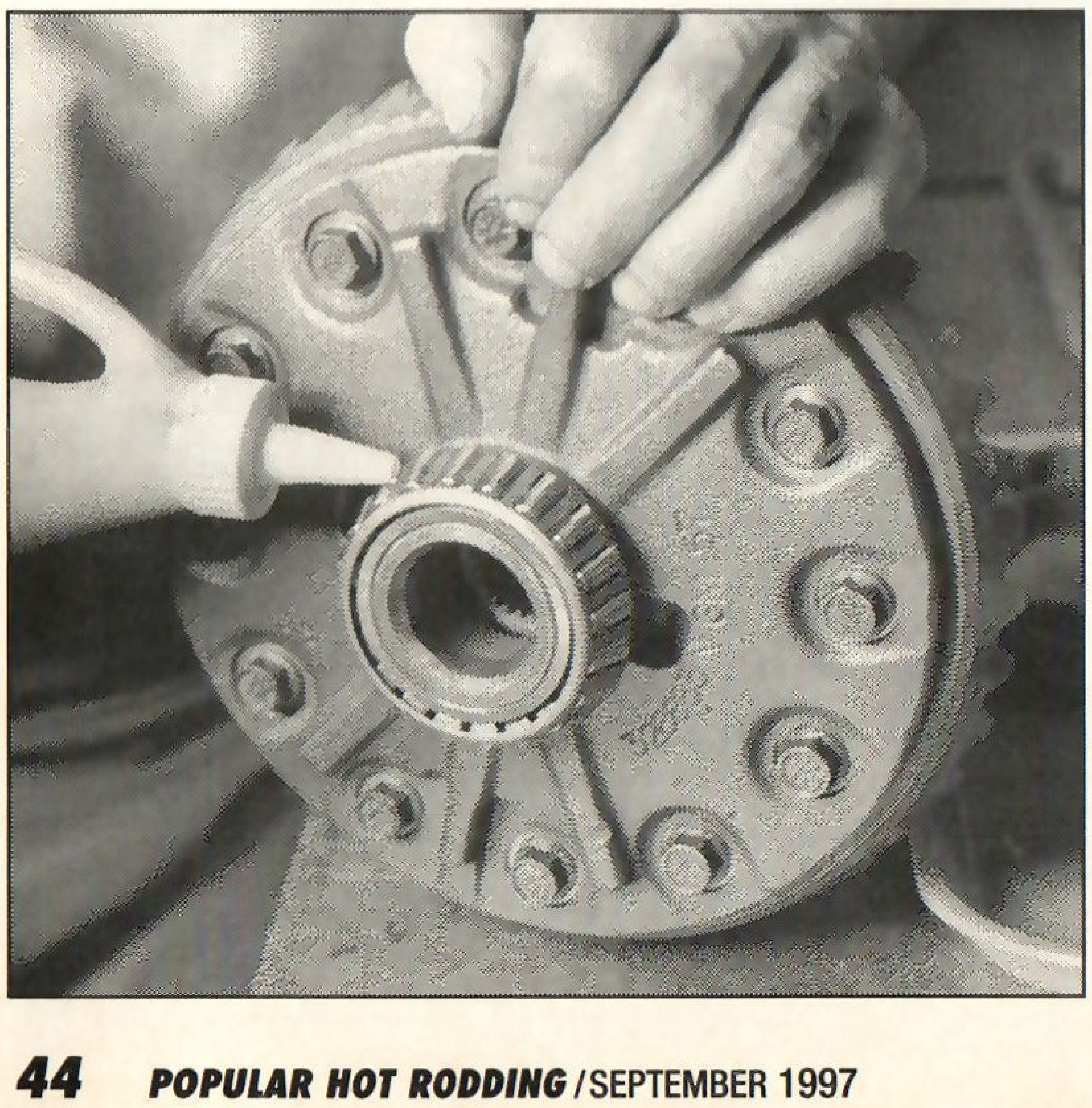
Randy also mentioned something that a lot of folks don't seem to realize, which is that, by changing the gear design or manufacturer, the noise level inside the car may also change, sometimes drastically. It seems that the OEM gears are highly developed; with production runs measured in the millions of units, only the most precise (and expensive) equipment is used to manufacture them, and they are designed to be as unobtrusive in operation as possible to the car-buying public.

Aftermarket gears, on the other hand, are generally produced for your basic gearheads, so noise control is often given a lower priority. While someone changing

Once the proper pinion-bearing preload has been achieved, RPS installers routinely smack both ends of the shaft once or twice to make sure the bearings and races are still seated after the vibrations caused by the air gun.

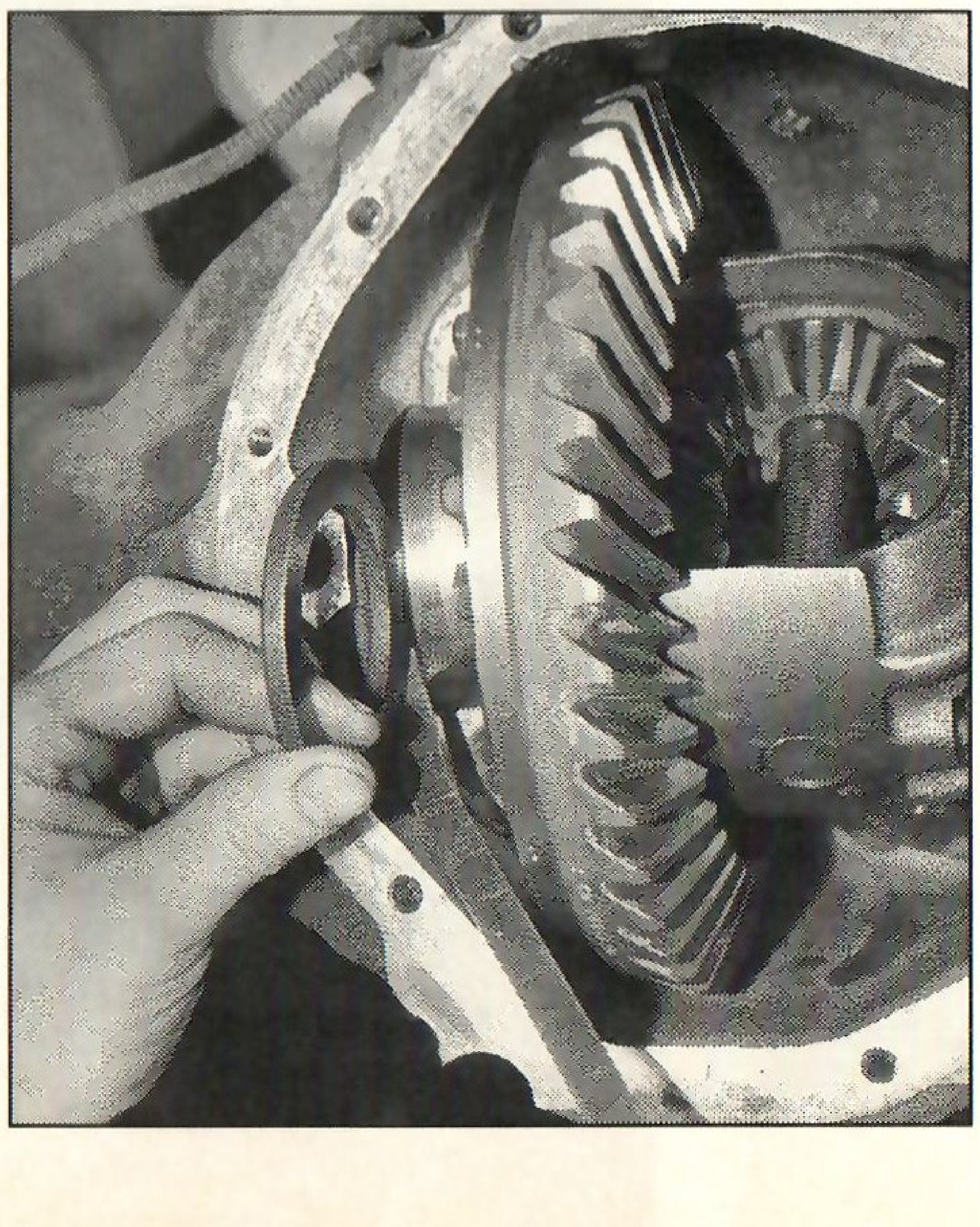


While holding the carrier up in the housing, the right-side shim is the first to be put in place.



After the pinion is snug and happy, it's time to get the carrier to join it. Gear oil is again utilized to coat the bearings before installation.

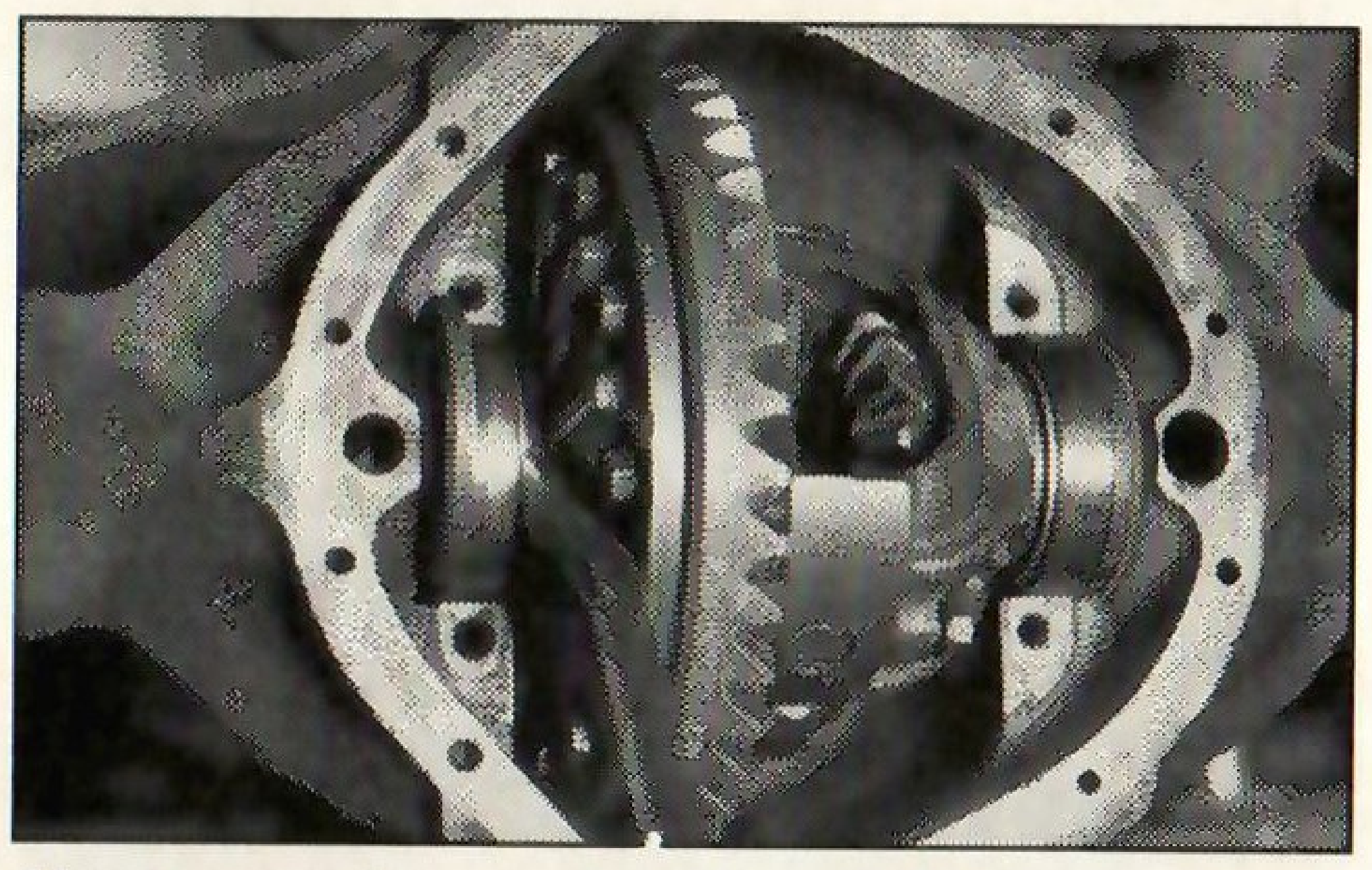
Here's where it can get tricky. Use a pry bar to wedge the carrier bearing's race over to the right, so there is enough room to get the left-side shim partially into position.



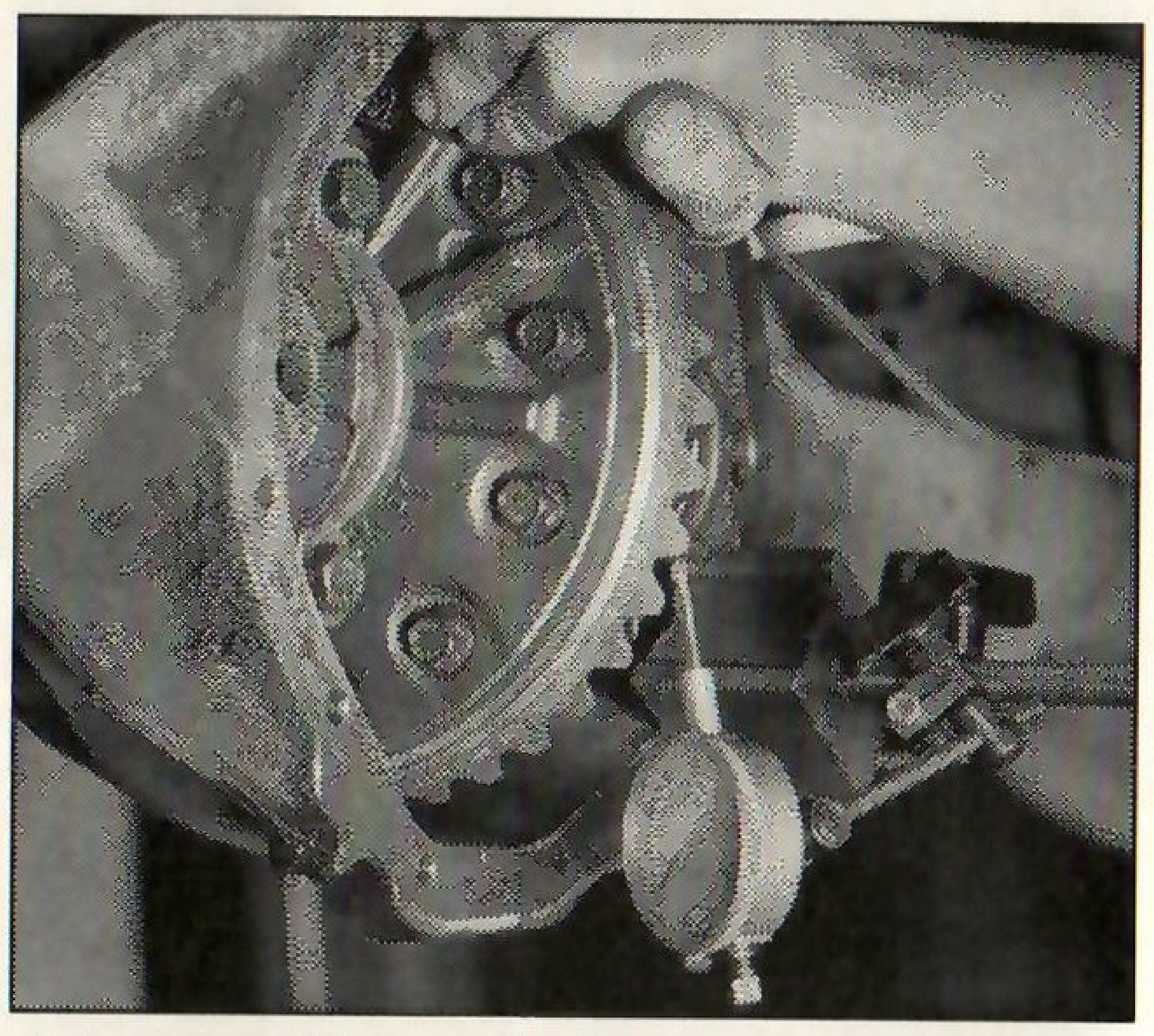
to a peppier gearing may expect to experience a change in engine sound, due to the higher rpm at which it will be running, any new noise from the rear can be more than a tad disconcerting, although it may be completely normal.

Well, on with the show. Working under the assumption that a picture is worth a thousand words, we'll give the typesetter a break and let the photos tell the rest of this particular story . . . this is a story about a 12-bolt, remember? And speaking of breaks, after hearing of the van disaster recounted at the beginning of this piece, Randy offered his opinion as to the cause of the problem. "Simple," he said. "The pinion nut probably worked loose, and the pinion just got sucked further into the housing. That's all it takes."

With this in mind, we can guarantee that, in the future, whenever we pull a driveshaft to check U-joints, we'll be putting a wrench on the pinion nut to make sure it's still snug!



Next, use the pry bar to get the race straight again, then drive the shim all the way down.



After installing and tightening the bearing caps, a dial indicator is positioned so it is perpendicular to, and reading off of, the drive (straight) side of the ring gear. The measurement recorded while rocking the carrier back and forth, without moving the pinion gear, is the very critical backlash setting. It will often take repeated attempts to achieve the proper numbers, which means pulling the carrier, and sometimes the pinion, to change the pinion shim and/or the carrier shims to increase or decrease the backlash, and then repeating the installation steps. This is not the time to be in a hurry! →

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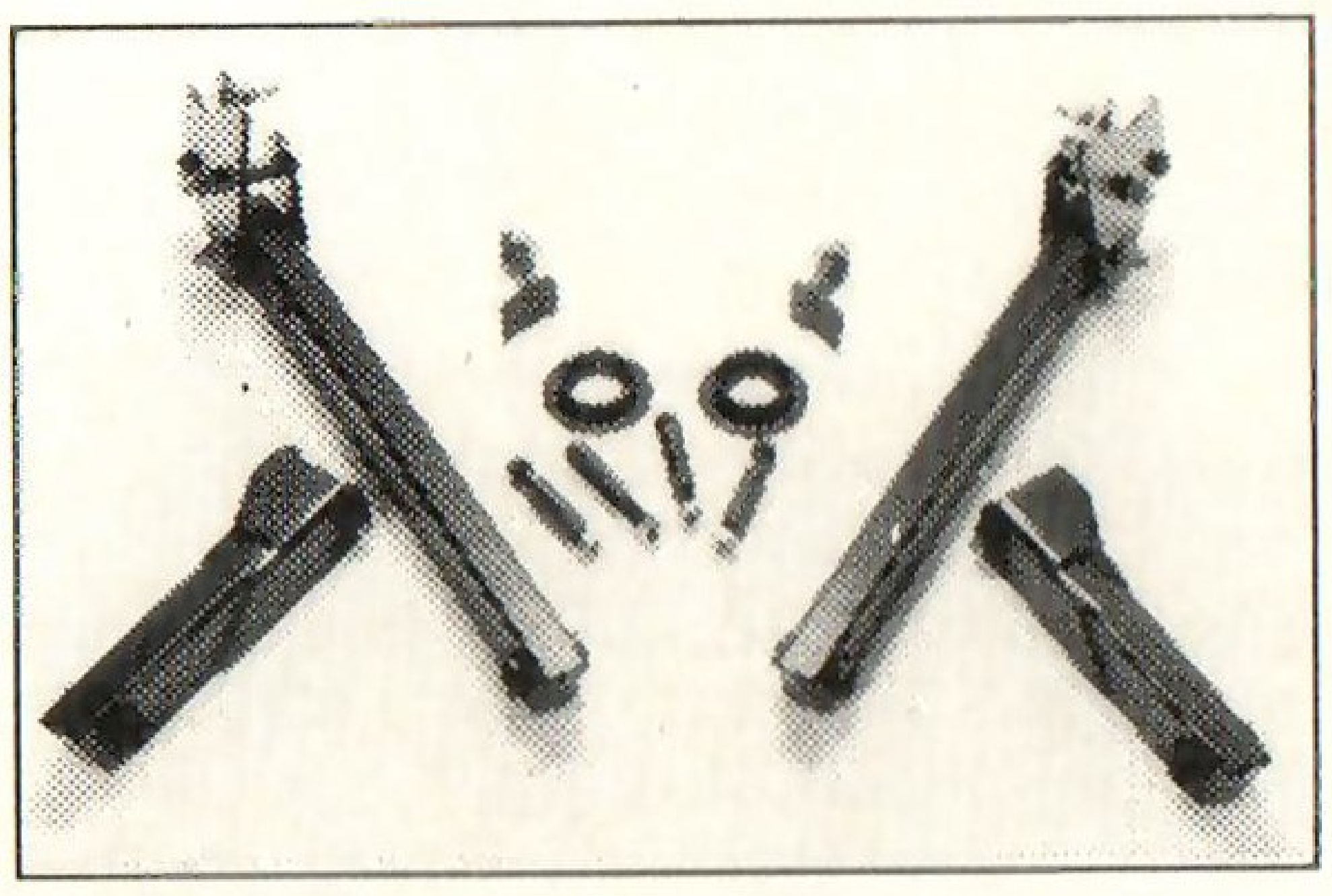

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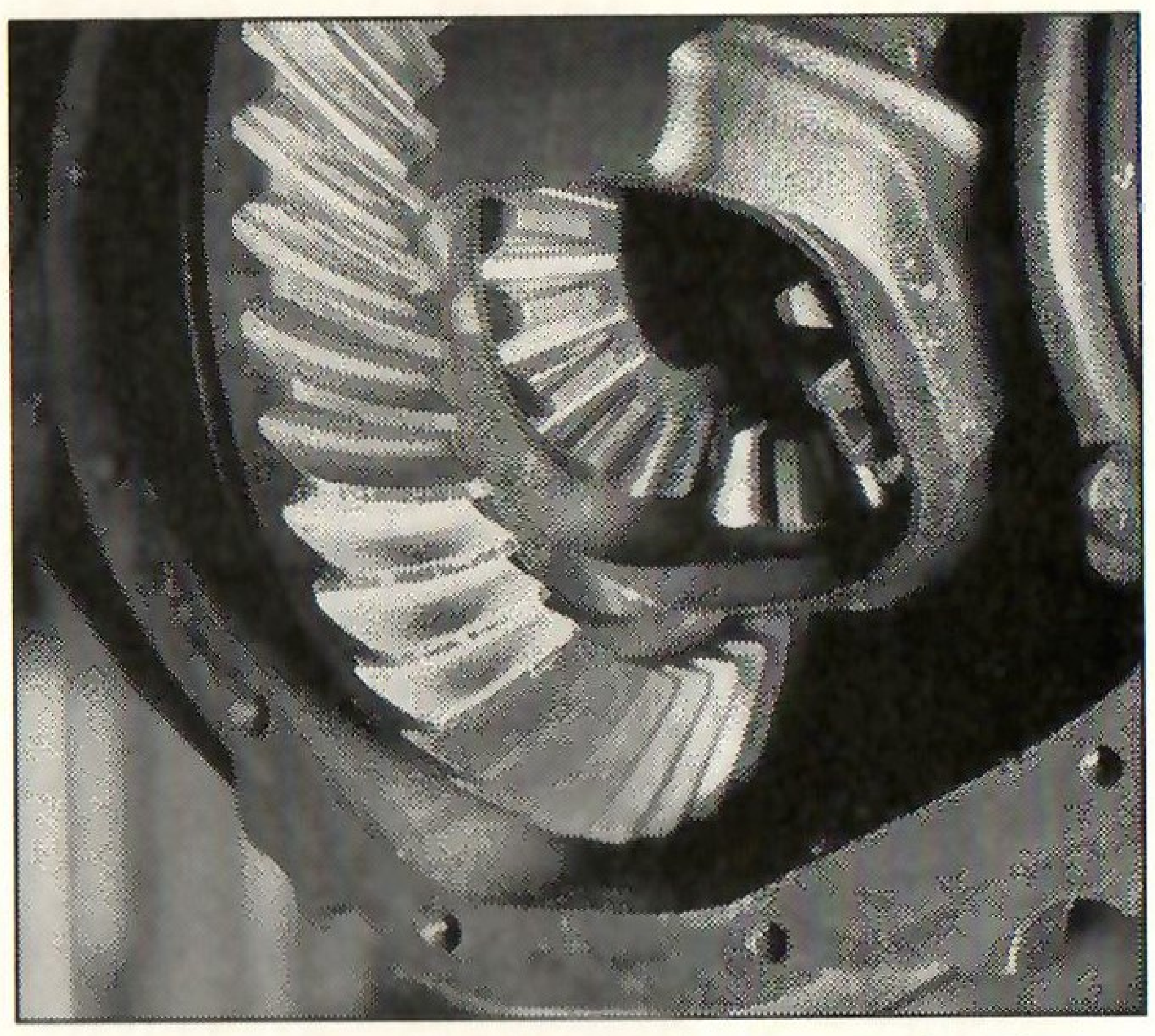
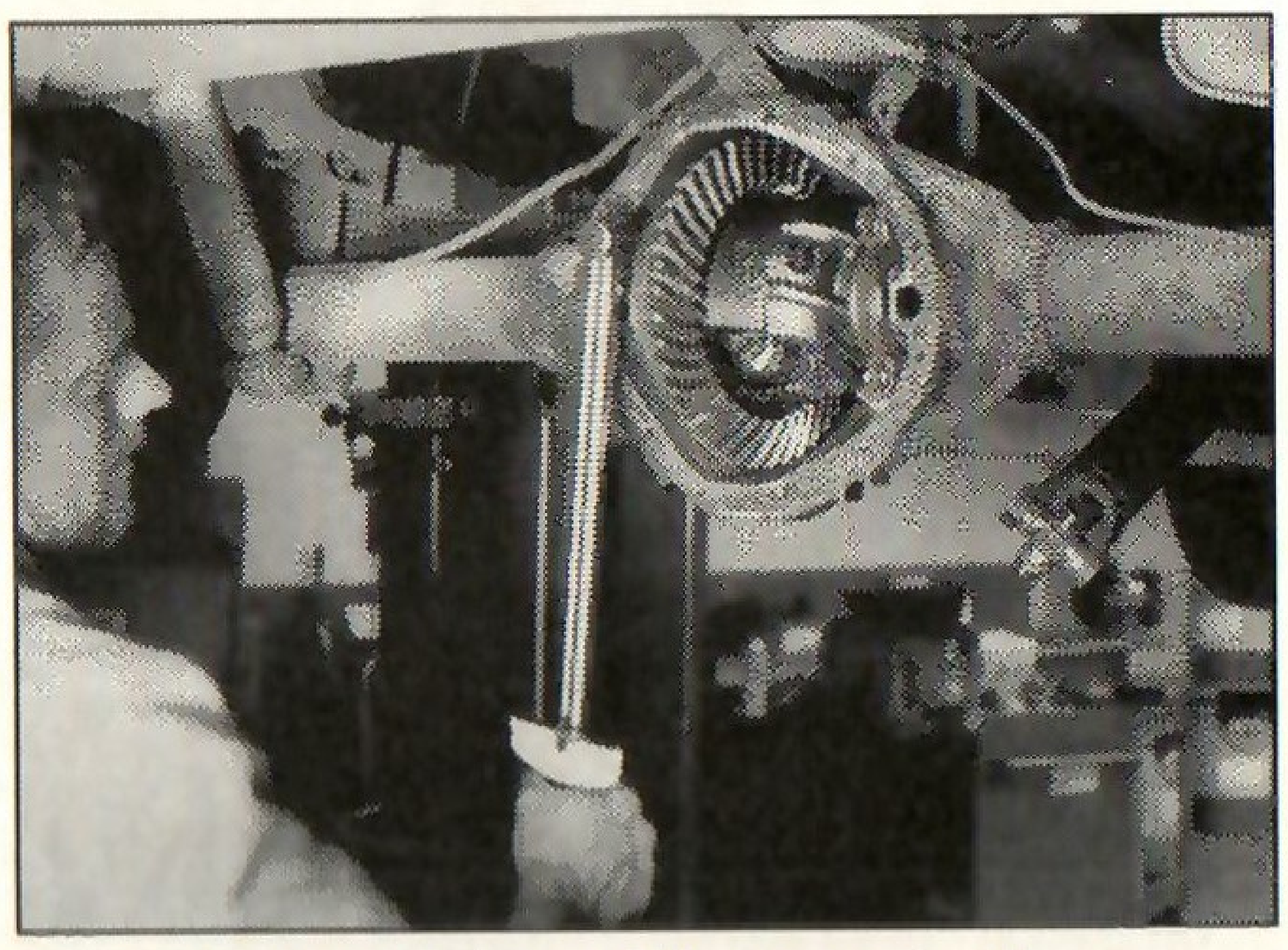
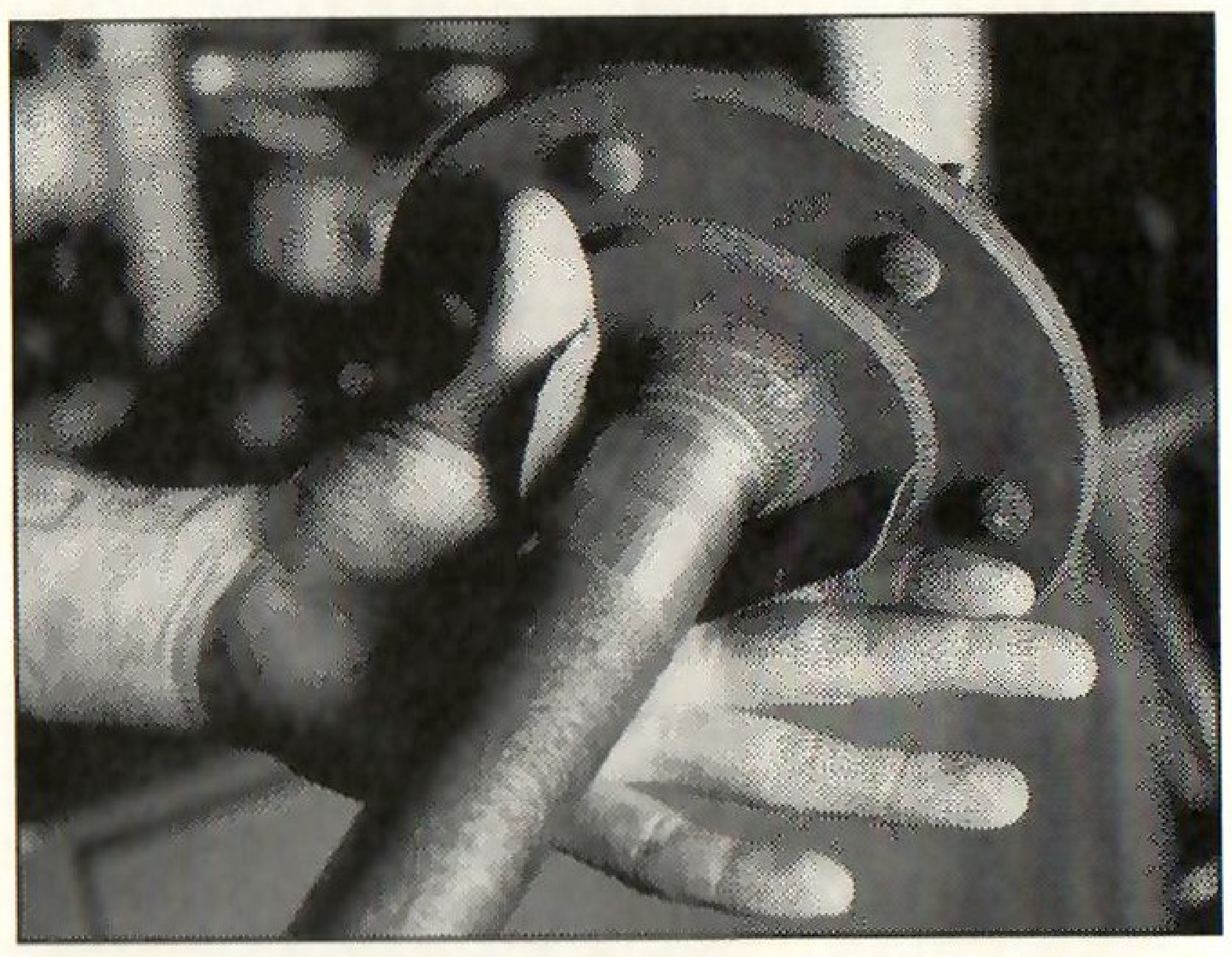


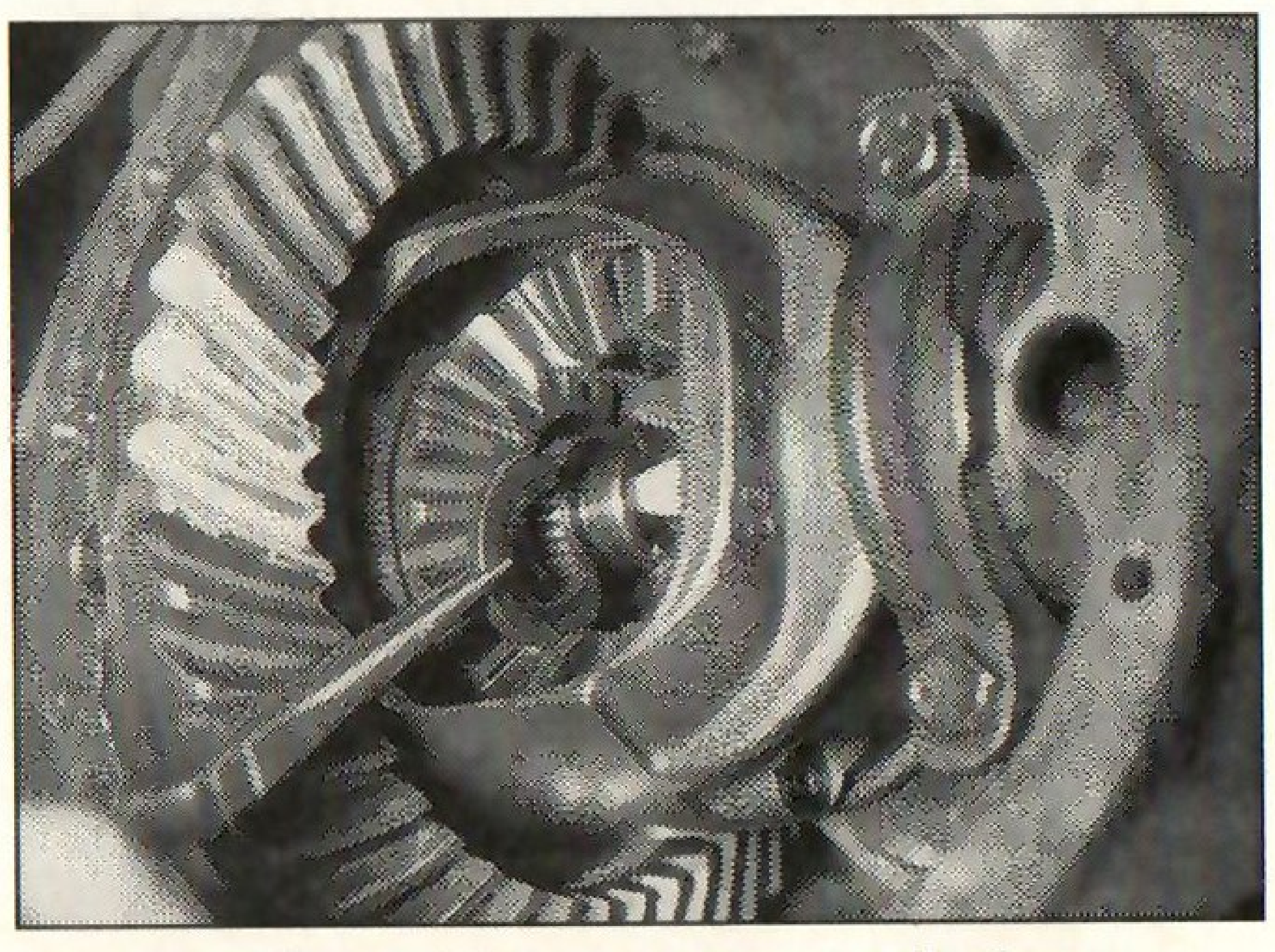
After achieving backlash nirvana, paint three teeth of the ring gear in a couple of different places and run the carrier around by hand a few times, going back and forth to get a good pattern. This is an acceptable coast-side pattern.



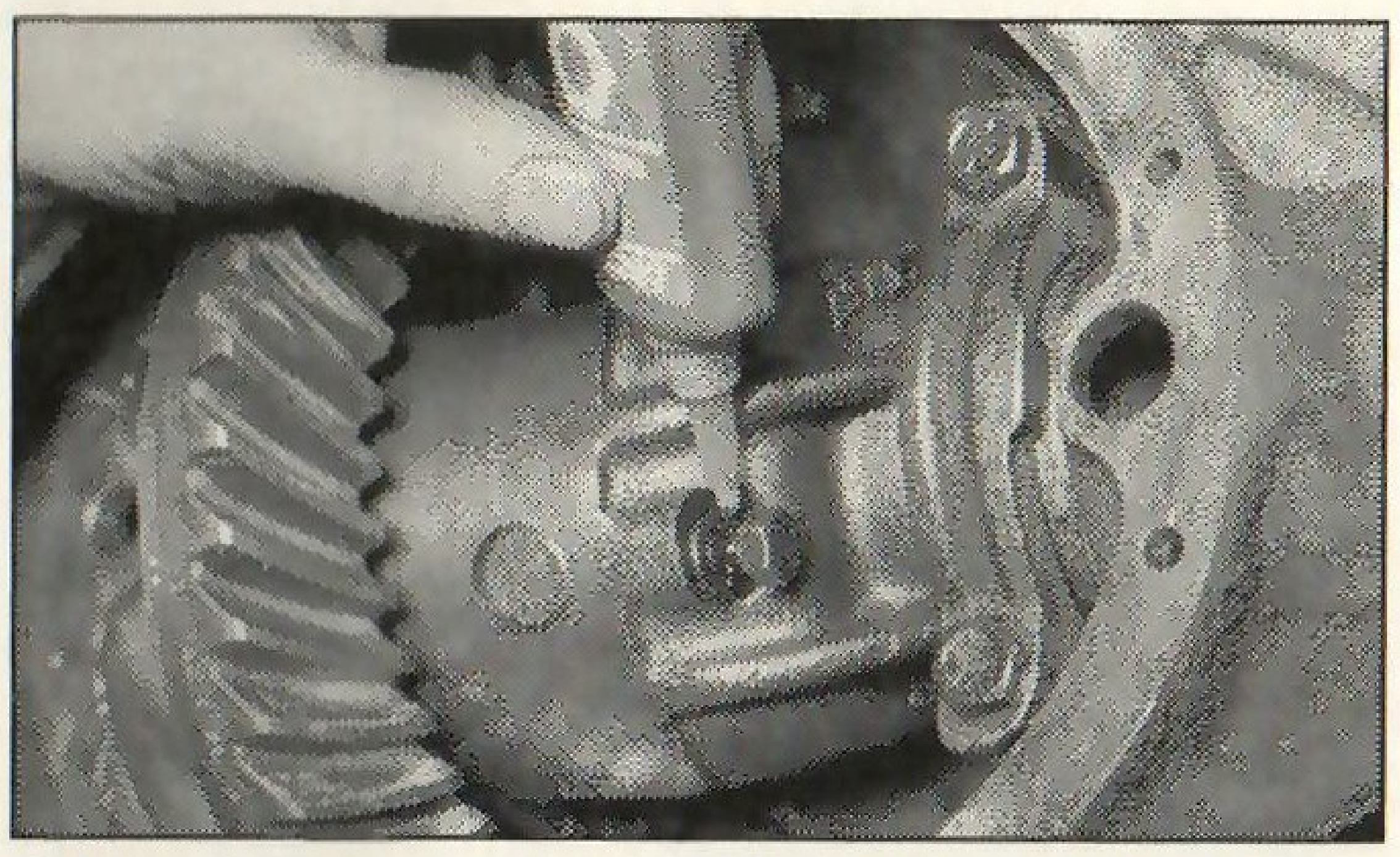
After the backlash and the gear-tooth patterns are within specs, a little celebratory dance is allowed, after which it's time to torque down the bearing caps.



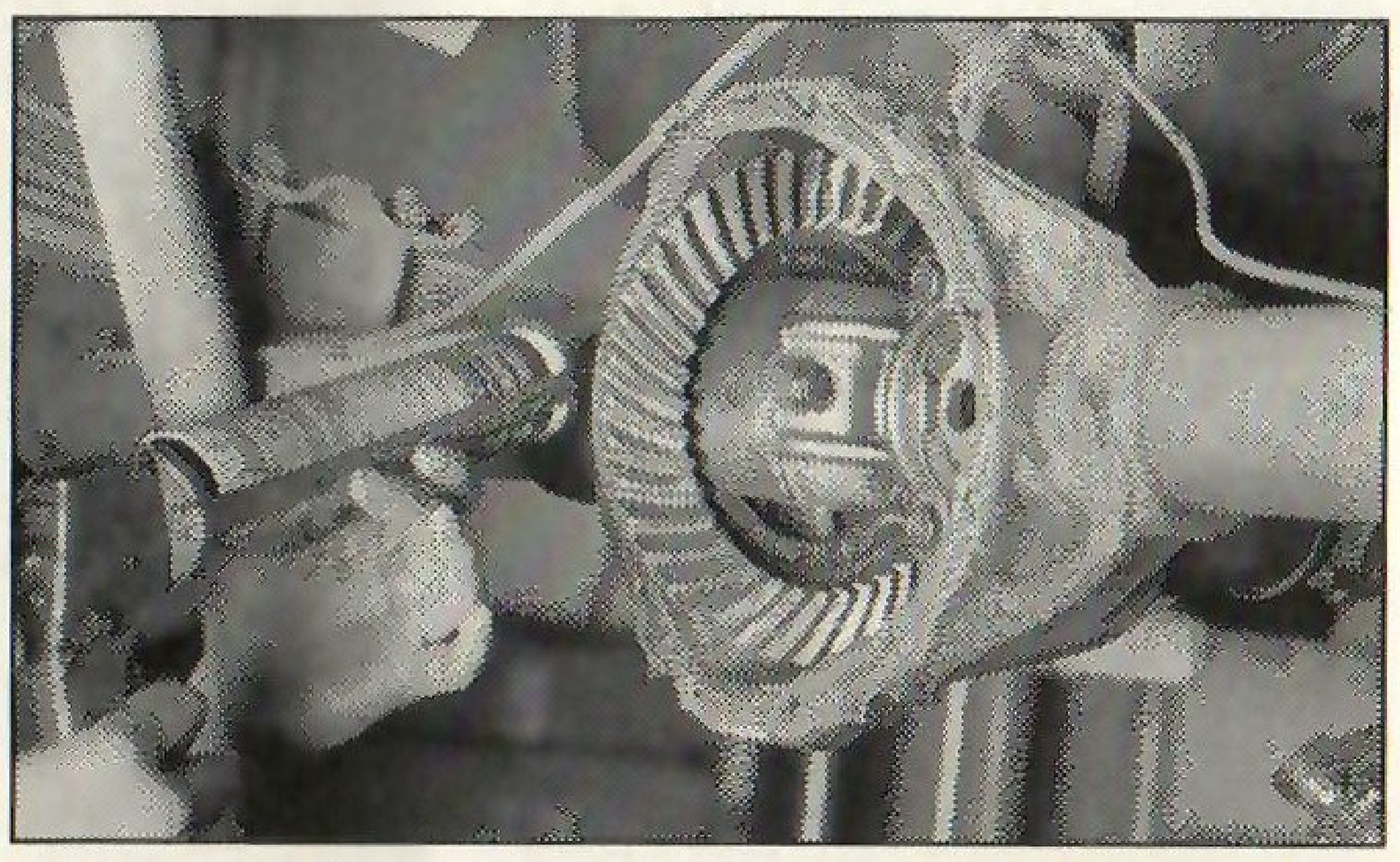
Before shoving the axles back in the tubes, RPS always dresses the bearing-contact surfaces with a fairly fine abrasive cloth, followed by cleaning with solvent.



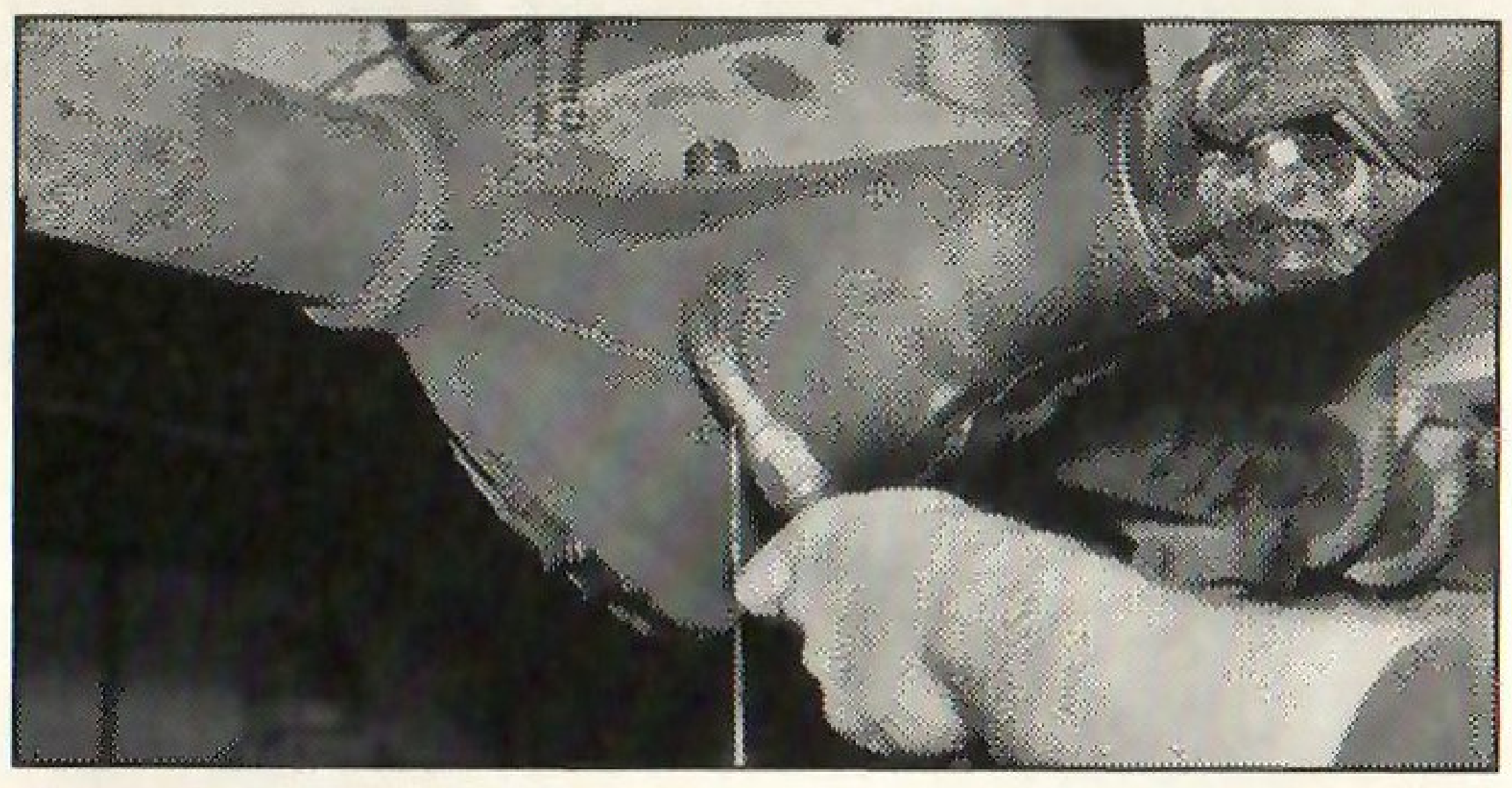
Remove the spider-gear crosspin from the carrier to allow the installation of the C-clips on the ends of the axles.



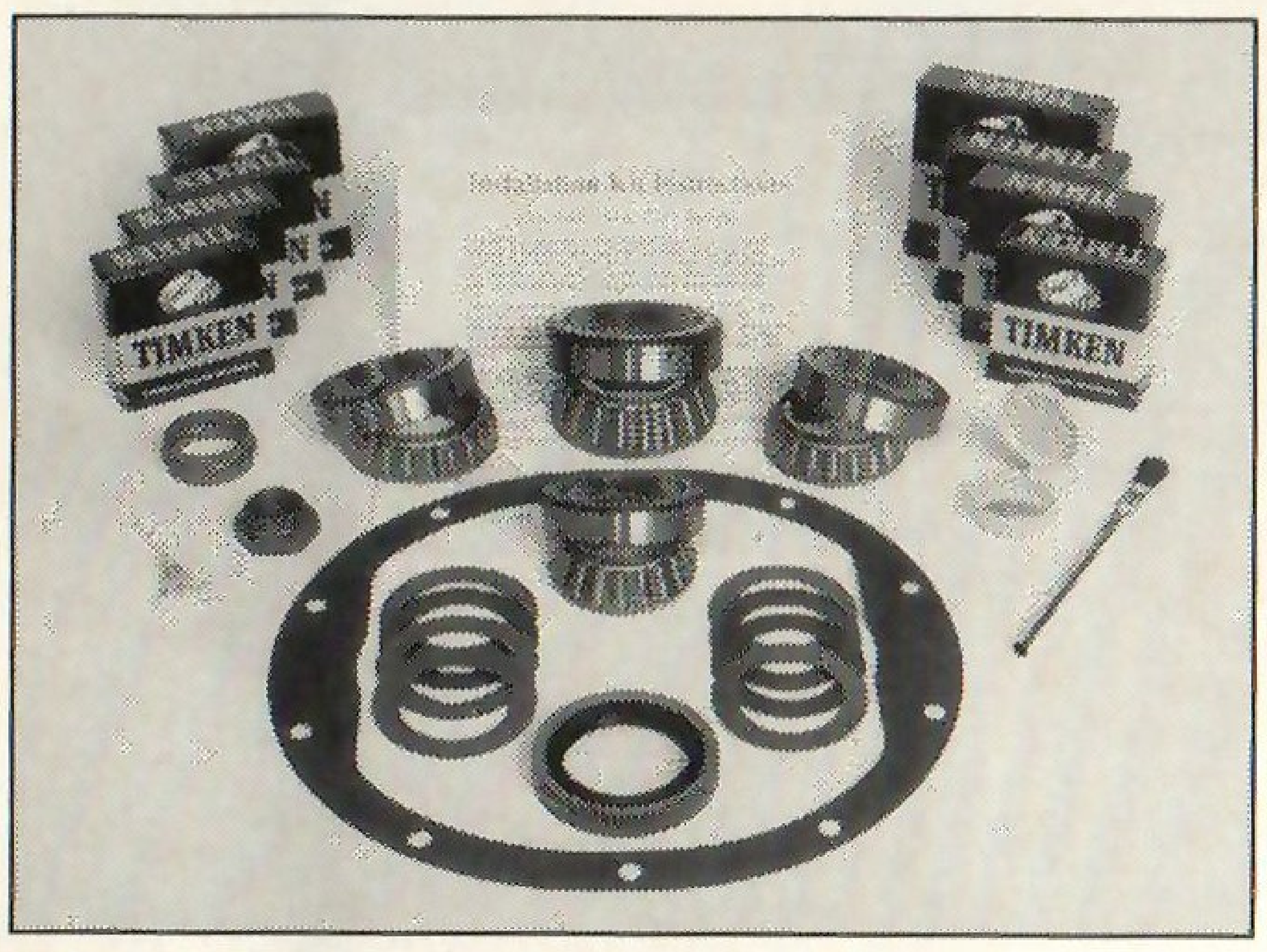
Slide the crosspin back in place to secure both the axles and the spider gears. Loctite® is again recommended, this time on the threads of the screw used to keep the pin in place.



Either RTV or a gasket is used to keep all the fluid on the gears and off the road.



Speaking of fluid, don't forget to fill the housing back up with the high-quality gear oil of your choice (and application) before you hit the road.



Ring & Pinion service assembles and stocks 78 different installation kits, which apparently so overloaded our photographer that this 10-bolt kit will have to serve as a reasonable facsimile of the contents of the 12-bolt version.

SOURCE:

RING & PINION SERVICE
11630 Airport Rd., Suite 300, Dept. PHR
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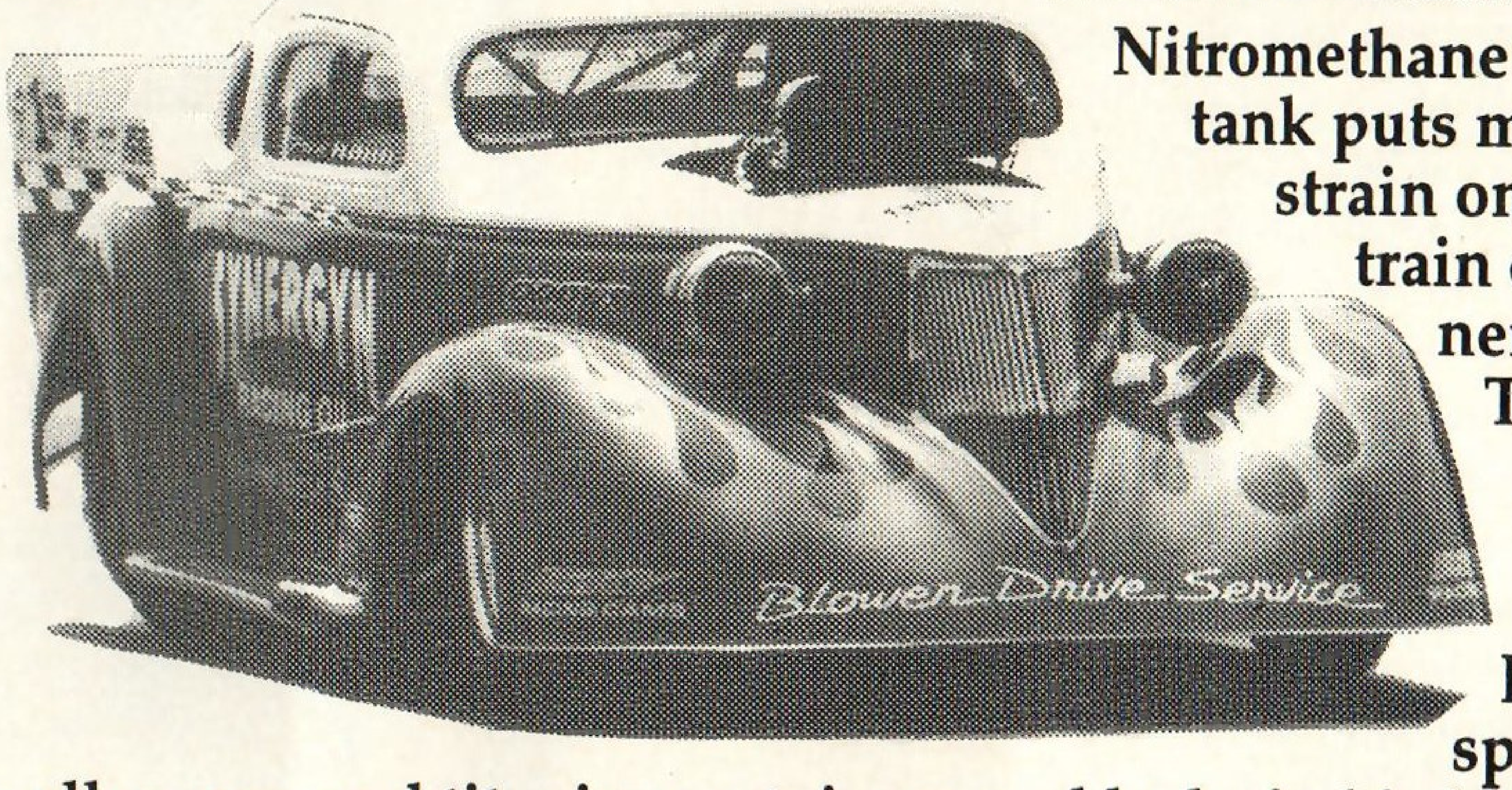

Nitromethane in the tank puts maximum strain on valve train components. That's why Jim Oddy relies on Isky valve springs, roller cam, and titanium retainers and locks in his blown '37 Chevy coupe. Fred Hahn drove it to wins at the first two Super Chevy *Nitro Coupe* races. It ran 6.572/211.36 at Memphis and 6.43/217 at Pomona!

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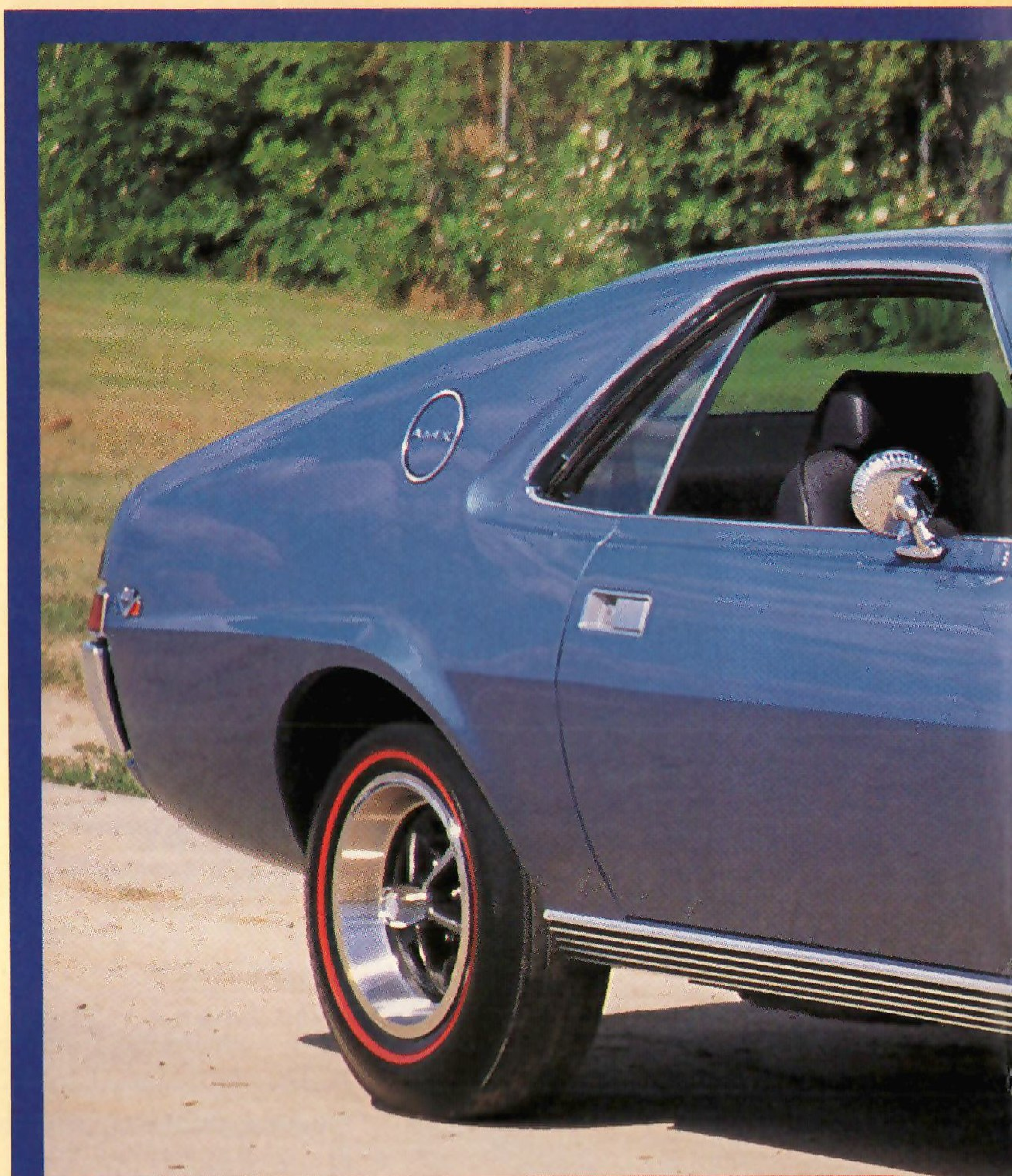
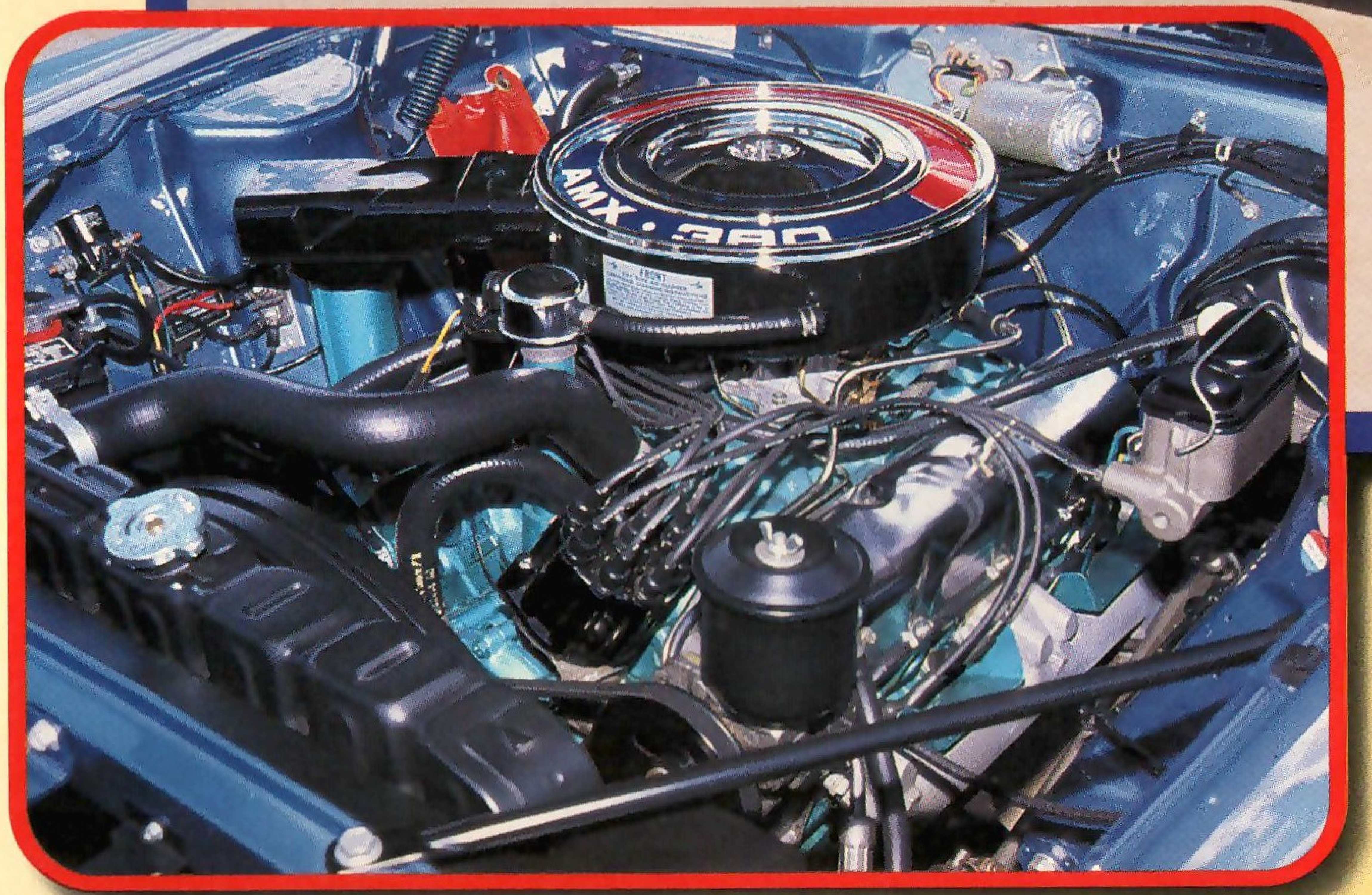
SHORT & QUICK

BY DARREL ARMENT

You would think a nicely equipped, stylish, and powerful two-seater would be a magnet for would-be muscle car buyers. Such was not the case with the emergence of American Motors Corporation's under-appreciated AMX. Even with a price tag somewhere around $2,000 less than any other two-seater with similar power and handling characteristics, the fledgling baby boomers still didn't seem to notice.

The rugged little AMX was available with three powerful V-8s to choose from — the 290, 343, or 390 with horsepower ratings from 225 to 315. Buyers could choose between a Hurst-shifted, Borg Warner close-ratio four speed or a three-speed automatic. Impressive box-stock times ranged from 14.70 to 15.20s at 90 to 95mph (0 to 60 times were 7.2 seconds or less). Some guys did take notice — namely racers in the NHRA Super Stock category.





One such competitor from Rhode Island held his class record for a number of years. Following the NHRA tech specs, AMX Super Stockers ran in the low 10s at 130mph, and still the public didn't notice!

The truth is, AMC could not overcome its image as the maker of econo cars that were long on gas mileage and reliability, but short on style and power. As a result, the 1969 AMX saw production numbers tallying a mere 8,293, which was very much overlooked at the time (and continues to be today).

Fortunately, there are people like Deacon Kallish of Melbourne, Florida, who always liked the AMX and took on the task of preserving a nice example of the breed. Stored since 1976, the odometer revealed it had only been driven 43,000 miles when Deacon found it in 1991 — plus, it came complete with a large cache of N.O.S. parts. Due to its good condition, mostly cosmetic enhancements were needed to bring it up to 100-point excellence. Much of that included some mild body work, a fresh coat of Beal Street Blue, PPG basecoat/clearcoat, applied by Ken Thuber of Rockledge, Florida. Then came the usual elbow grease, parts chasing, and general dedication by Deacon. Mechanically, the 390/315hp bullet was disassembled by Alan Krimkaul of Orlando, Florida, fully inspected, and rebuilt to factory specifications. Along the way of course, it was detailed to the max.

The efforts of Mr. Kallish have been rewarded with many show trophies, including "Best of Show" at the 1995 American Motors Owners Nationals. Coupled with those honors, countless hours behind the wheel have also been enjoyed, because that's what owning a classic muscle car is all about. Take a closer look at some of the AMC offerings and you'll realize their true potential has really been overlooked. Many consider them to be the last affordable American muscle car. PHR

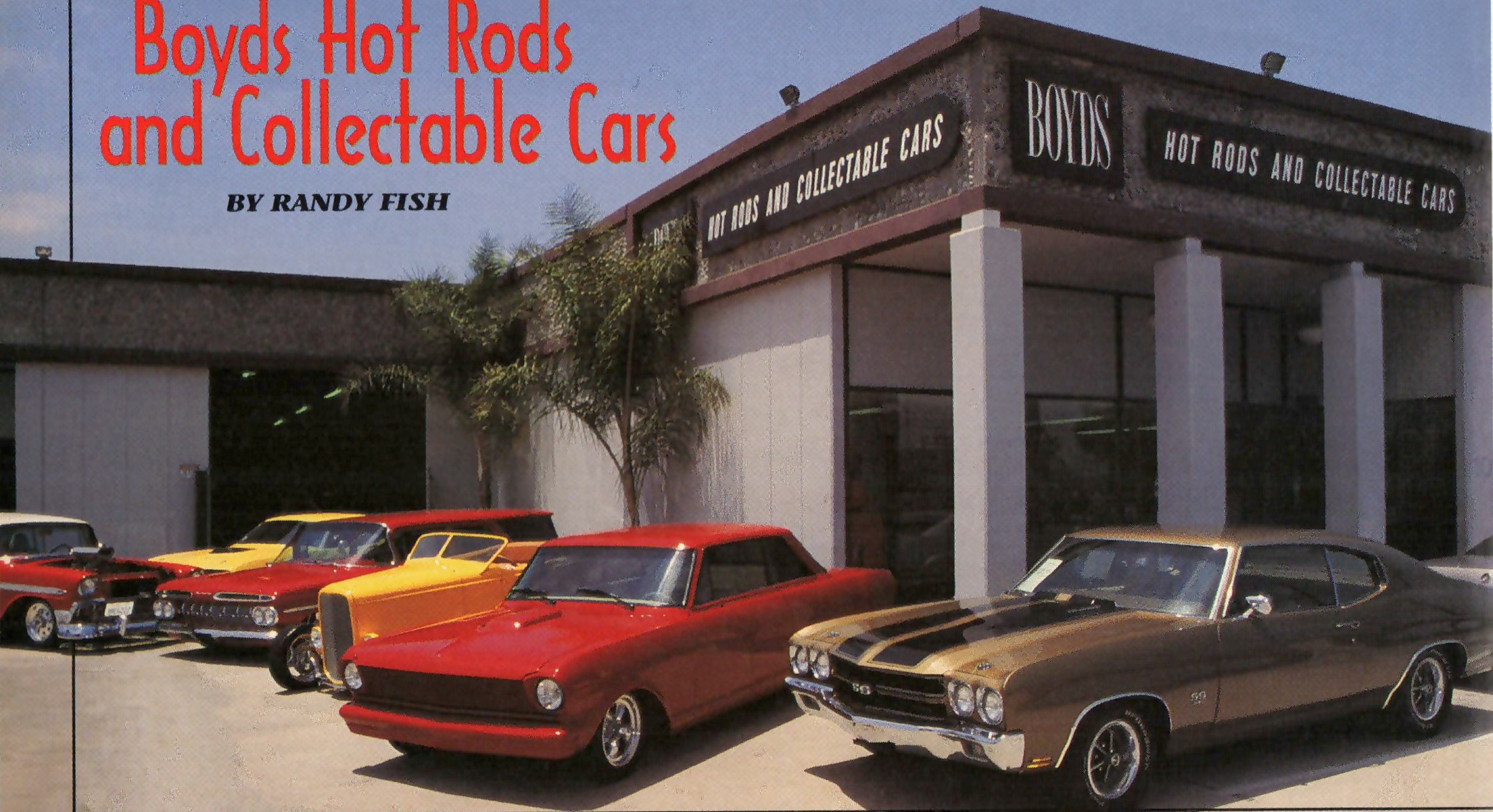
The Often Overlooked AMX

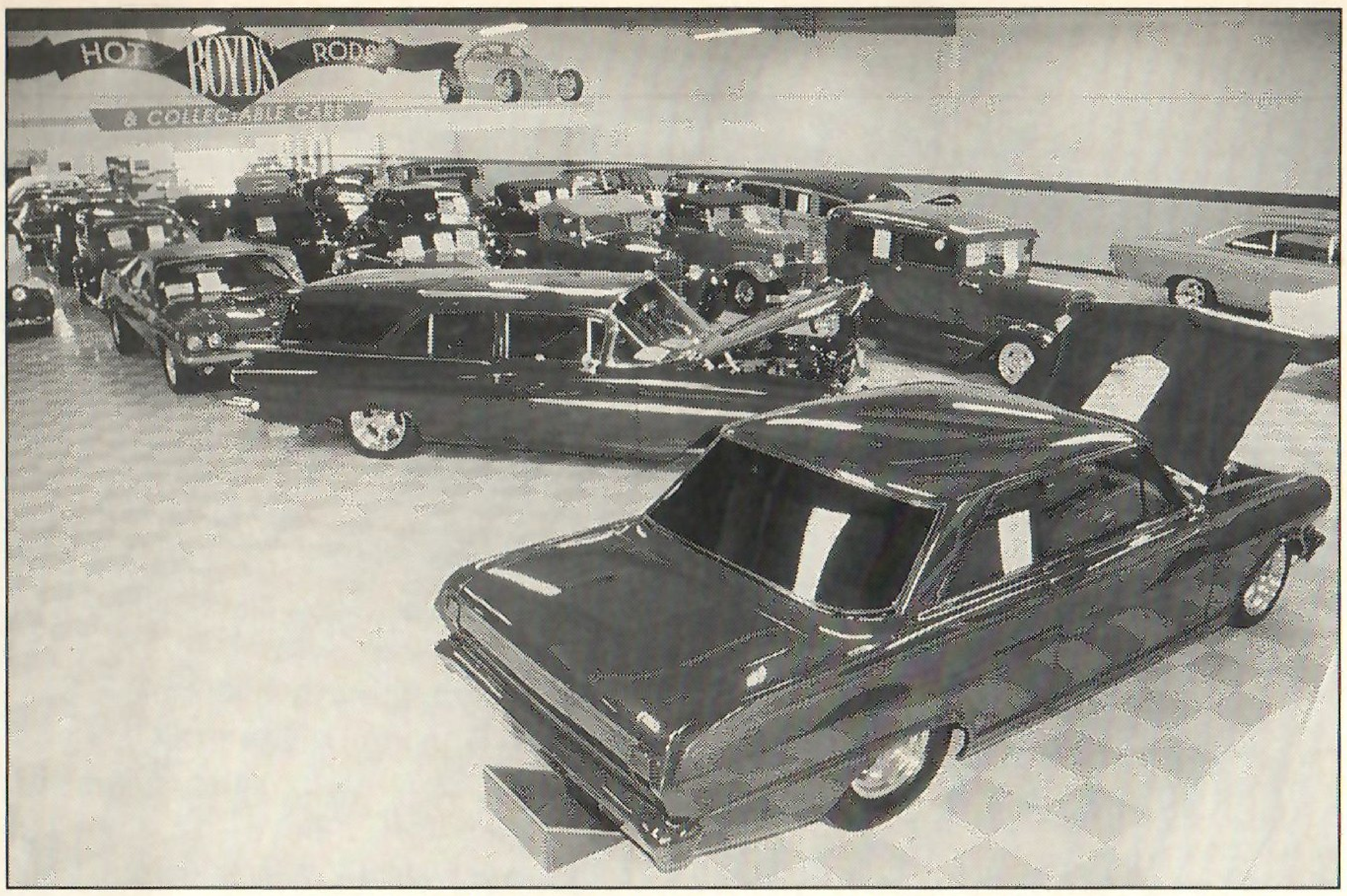
HOT BOYDS RODS
& COLLECTABLE CARS

THE SUPERCAR SUPERSTORE

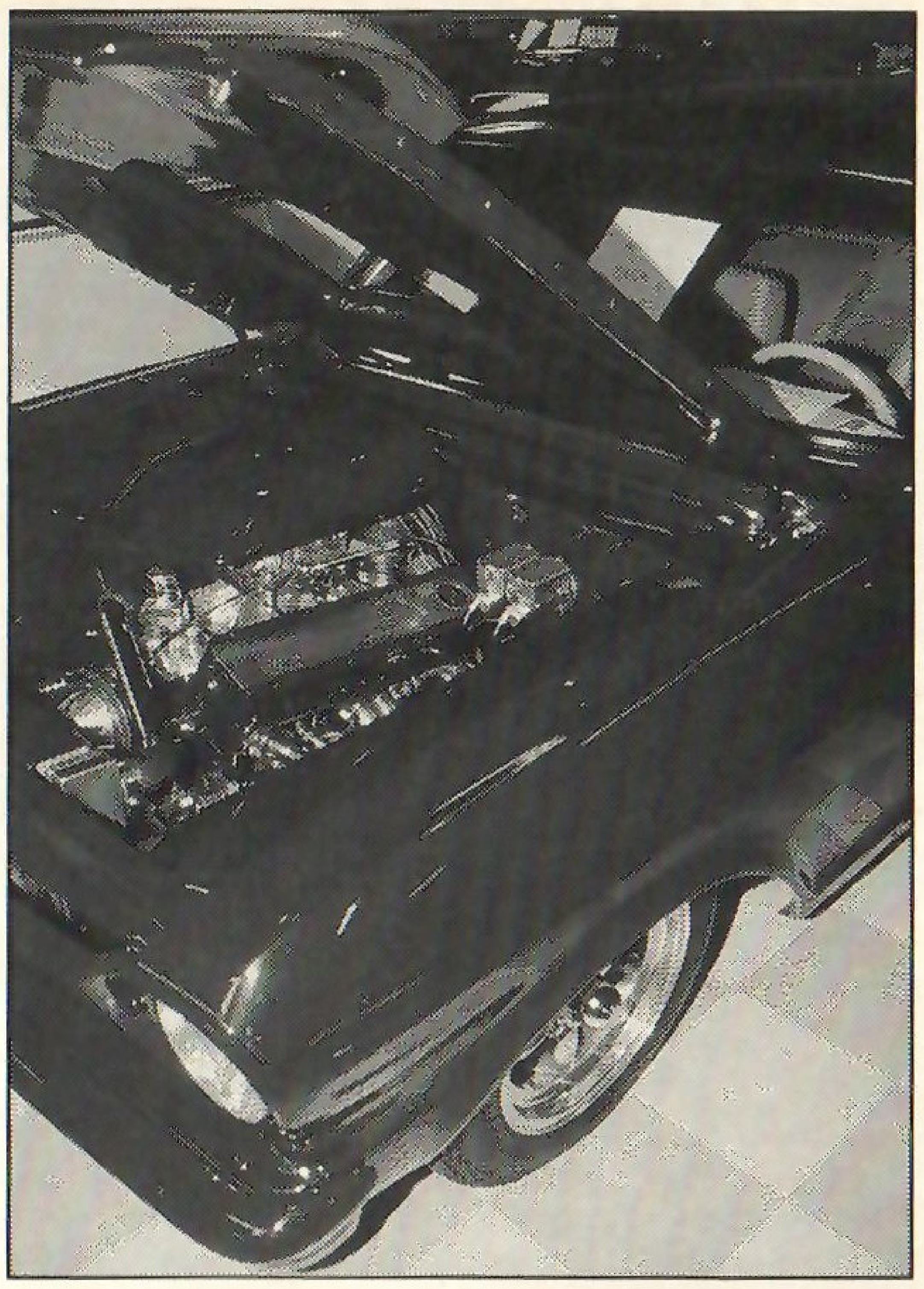
Boyds Hot Rods and Collectable Cars

BY RANDY FISH


HOT RODS AND COLLECTABLE CARS
BOYDS
HOT RODS AND COLLECTABLE CARS



Two of our favorites included the gorgeous '65 Nova and the equally awesome '59 Chevy Brookwood wagon. The Nova featured a Chris Alston chassis with Aldan coilovers up front and a leaf spring/ladder bar setup in the rear. Flawless workmanship included shaved handles and trim, filled cowl, custom grille, tubs, contemporary interior, and Glasurit urethane paint. The Brookwood rode on a late-model Corvette suspension, 'Vette LT-1, TH350, and Boyds wheels.

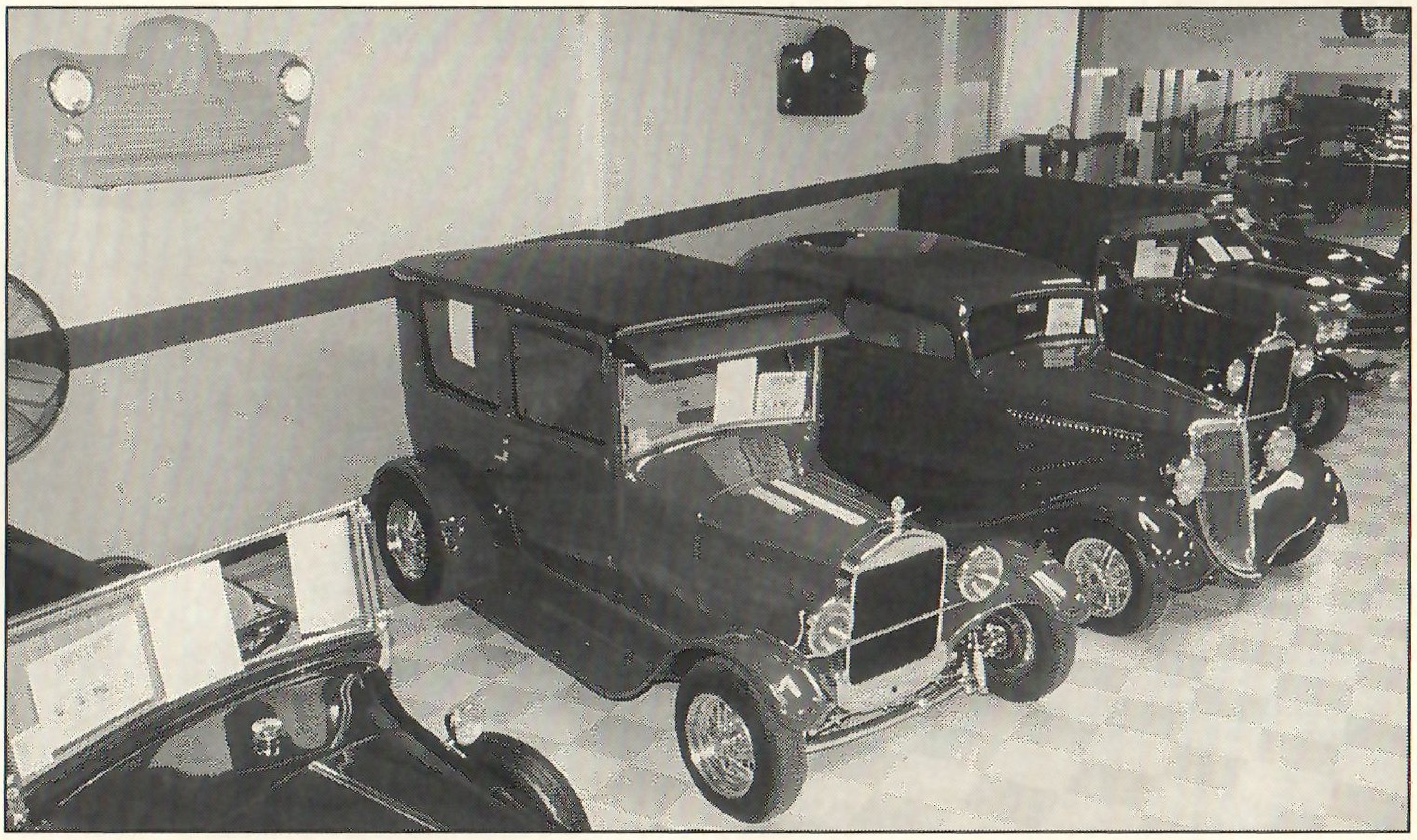


We just had to show you some more of the Nova. The under-hood detailing is second to none. We're talking hand-formed splash panels, smooth firewall, custom air scoop, and even the underside of the hood is finished off with a smooth, color-matched panel.

A few years ago (1994), Boyd Coddington began another venture as part of his already busy rodding empire. Having built high-profile hot rods and customs for several years, and also successfully introducing billet aluminum wheels to the automotive aftermarket, the next logical step was to provide a special type of used car superstore. Hence, Boyds Hot Rods and Collectable Cars located in Stanton, California. The store is managed by Jim Stecher, a long-time hot rodder and overall automotive aficionado, who receives sales and administrative support from Dave Eagle.

Like every other phase of the Boyds conglomerate, the pre-owned car store is nicely appointed and well decorated, which makes for a pleasant place to do business. Like we said earlier, Hot Rods by Boyd has been building some of the world's finest street rods and specialty cars for several years now. Many clients who ordered specially built coupes, roadsters , and sedans tend to be "horse traders" now and then. Some of Boyds earliest hot rod customers expressed an interest in trading their "old" Boyds car for a newer version, which does account for some of the more special cars offered for sale. And so the story goes.

This part of the showroom housed mostly newer ('50s) vintage sweeties. That clean '56 210 post had the original six-cylinder, automatic transmission, factory power steering, and only 100,000 original miles. The '55 sitting next to it had a body-off restoration (also powered by the original six-cylinder) and strangely enough, is a one-owner car!



Street rod freaks delight! Serious shoppers can usually choose between several varieties of the Model A, the always favorite '32 Ford, '33/'34s, and fat-fendered cars.

→

Desirable muscle cars also show up on the floor at Boyds. When's the last time you saw an original Shaker 383 'Cuda cruising down the boulevard? This was one righteous Mopar!

Mr. Coddington finally implemented the idea, which now gives real enthusiasts a place to find top-quality cars at a fair market price. Boyd and Jim both believe very strongly in being up front and honest with their customers. That very principle is why people come from all over the world to shop at Boyds. The clean 6,500 square-foot showroom will house about 57 cars, and you'll normally find between 40 and 50 cars on hand at any given time. Visitors, tire kickers, and serious shoppers generally total anywhere from 40 to 80 people each day (with more on Saturdays, of course).

Although many cars are sold on consignment, Jim and Boyd travel all over the United States buying cars for their inventory. Many of these special pieces are found at various car shows and swap meets. Jim told us, "We get somewhere between 12 and 15 calls every day from people wanting to sell their cars." That's got to be a "win-win" situation, because it helps provide a wider variety for potential customers to see. Of the countless cars sold to customers in Europe and other far off countries, some are driven and/or collected, while others are used just for display purposes. Either way, Jim is a happy sales manager who moves an average of 20 cars every month.

If you're leery of actually building that special dream machine you've always wanted, call Jim and he'll give you the "skinny" on what's in stock. This specialty car "Salon d'Elegance" is definitely doing its part to keep the *"Popular"* in Hot Rodding!

SOURCE:

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76-79 ASPEN			249		6-PACK-289	SOON		149	YES
63 B-BODY			289			289			YES
64-74 BARRACUDA			209		6-PACK-289	209	249	129	YES
63-67 BELVEDERE			249		6-PACK-289	SOON	289	169	YES
87-96 BERETTA			229	249					YES
67-98 CAMARO	1999	599	209	229	25-OTHERS	SOON	229	119	YES
70-74 CHALLENGER			219		R/T-249,T/A-309			159	YES
66-74 CHARGER			209		6-PACK-289	209	289	129	YES
64-87 CHEVELLE	1999	699	219	229	AERO HOOD-289	209	229	129	YES
49-98 CHEVY	2199	649	229	289	DOMINATOR	209	259	149	YES
66-77 COMET			289		CYLCLONE-249		249		YES
66-70 CORONET			219		6-PACK-289	209	249	129	YES
427 CAB	899		199	-COMPLETE BODY PACKAGE $1399-			199	199	YES
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66-96 CUTLASS		749	209	249	W/30-249	229	259	159	YES
67-76 DART		699	209		6-PACK,AERO	209	249	129	YES
70-76 DUSTER		749	209		6-PACK,AERO	209	249	129	YES
63-71 FAIRLANE			249		T/BOLT,GS	259	SOON	149	YES
78-83 FAIRMONT			249					149	YES
60-69 FALCON			229		T/BOLT-289	209	269	129	YES
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75-81 MONZA	1999	749	209	209	AERO-289	179	229	169	YES
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62-79 NOVA	1999	749	209	229	L-88,AERO	209	249	129	YES
72-74 OMEGA			269				249	129	YES
78-87 REGAL			249	289				169	YES
68-74 ROAD RUNNER	1999	749	209		6-PACK-289	209	249	149	YES
68-72 SKYLARK			289	309	GS-289	239		129	YES
60-67 SUNBEAM			389		LAT-389				YES
83-93 T-BIRD			219	289	LOTS MORE		SOON	129	YES
72-76 TORINO			249		GS HOOD			149	YES
67-76 VALIANT		749	209		6-PACK,AERO	209	249	149	YES
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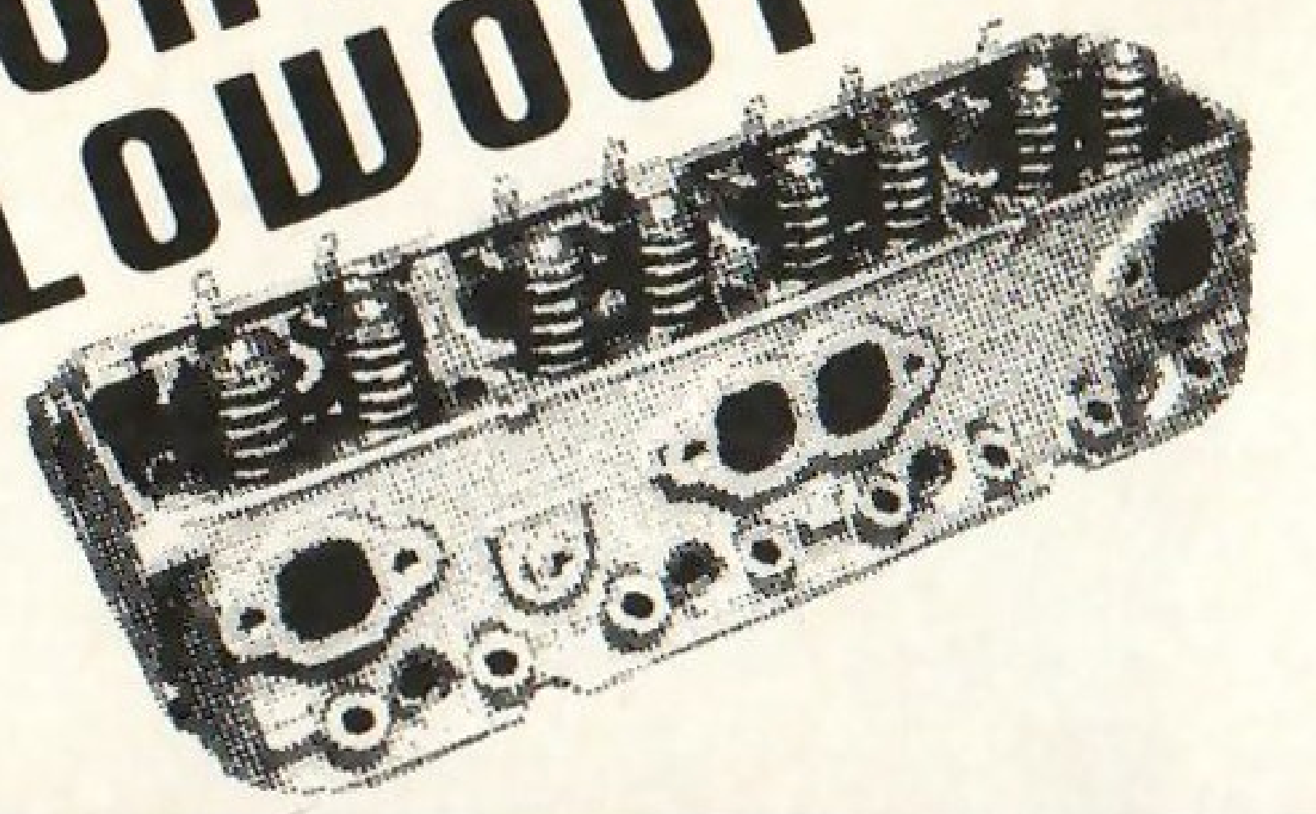

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BY CAMERON EVANS

Kenne Bell Stuns with Bolt-on Buick Items

Fans of American performance might think the supercharger rules the roost in terms of all-time popularity and fun. Nitrous-oxide is quickly gaining ground on our blown brothers, but it's the turbocharged vehicles which can lay claim to the most efficient of all power adders.

Though the turbo street machine isn't the most common animal of the road, the turbocharged Buicks built from 1986 to 1987 are still extremely popular and hold a place on the short list of legendary performance. In stock trim, the V-6-powered Regals, T-Types, and Grand Nationals made 240hp, easily putting them in the low 14s and quicker. Though they haven't been sold for a few years (and even the Typhoon/Prowler series stopped in 1992), the turbo cars were ahead of their time, giving smart enthusaists an interesting tool to beat up on those with normally-aspirated combinations.

No one knows all this better than the guys at Kenne Bell. With Buick development dating back to 1968 and GN technology brewing since the day these turbo cars were trucked out of the Flint plant, Jim Bell and his team of technologically-adept engineers stand on the podium as some of the best in the turbo Buick business.

YOU CAN MAKE HOW MUCH?

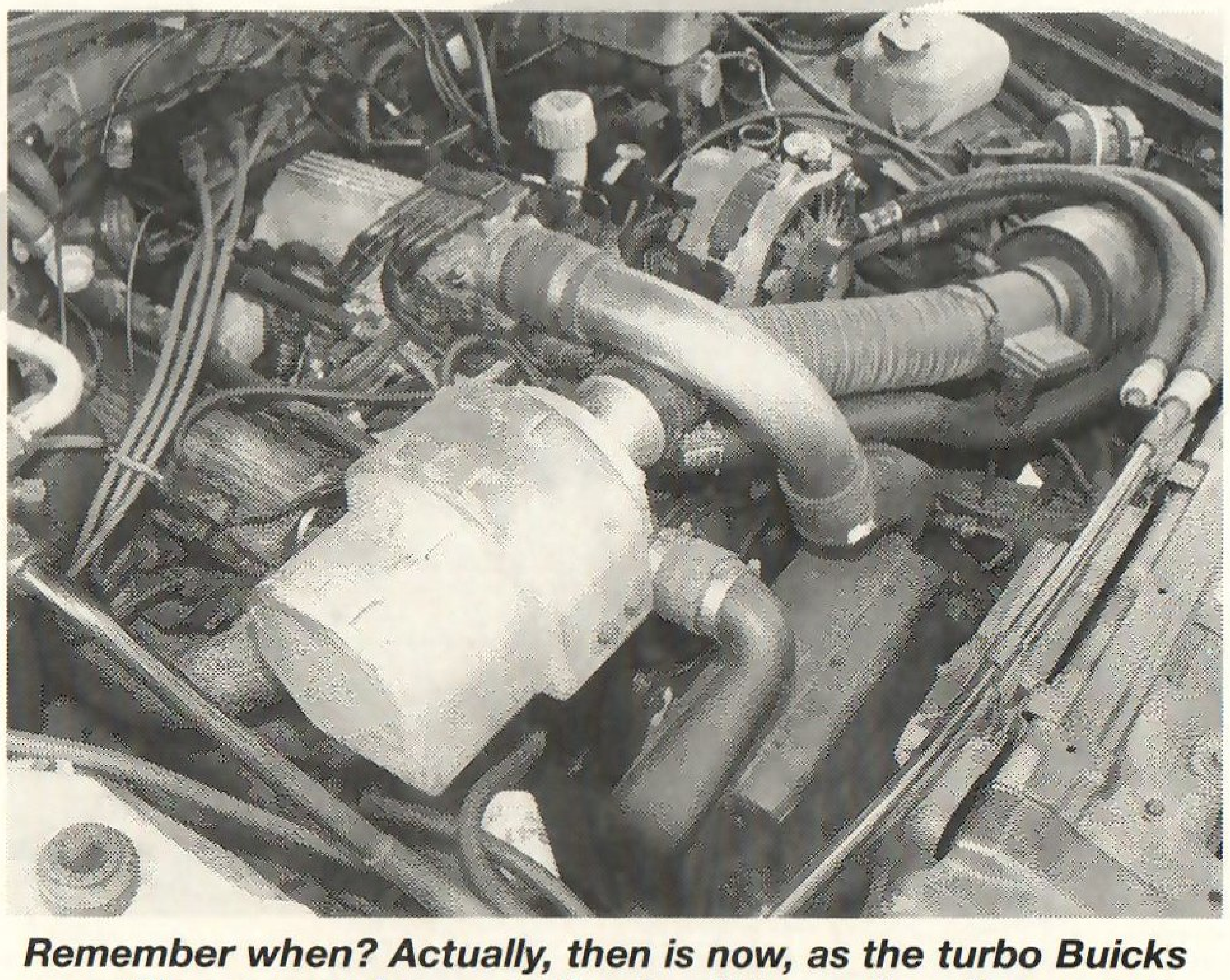
When Jim Bell told us he could double the power to the rear wheels on our in-house GN (owned by ad manager Bill Middaugh), we knew he wasn't joking. But, when he mentioned the valve covers would never be removed, we had a good laugh. Bolt-on parts can't take a 110,000-mile Buick from 200 rear wheel horses to 400. It's impossible. Kenne Bell came through on the promise, showing us how to reliably increase power through a series upgrades (each step well-documented on their Dynojet chassis dyno) which can be omitted or included as your wallet and interests vary. As far as we know, this is the first time anyone has taken the time to document each step — it took a long time to produce these figures, but the results are quite tangible.

Kenne Bell showed us the most important aspect in tuning a turbo Buick for power: air/fuel ratio. It's an expensive proposition to measure this calculation as accurately as Kenne Bell (the two Horiba air fuel ratio meters they use run $10,000 each), but you can simulate the relationship by adjusting fuel pressure with the basic parameters provided in this article and cheaper devices are available in the auto electronics aftermarket. However, lesser systems are only somewhat accurate in the range of 13.5 to 15:1, and which is of little value in precision tuning where ratios may run as low as 9:1.

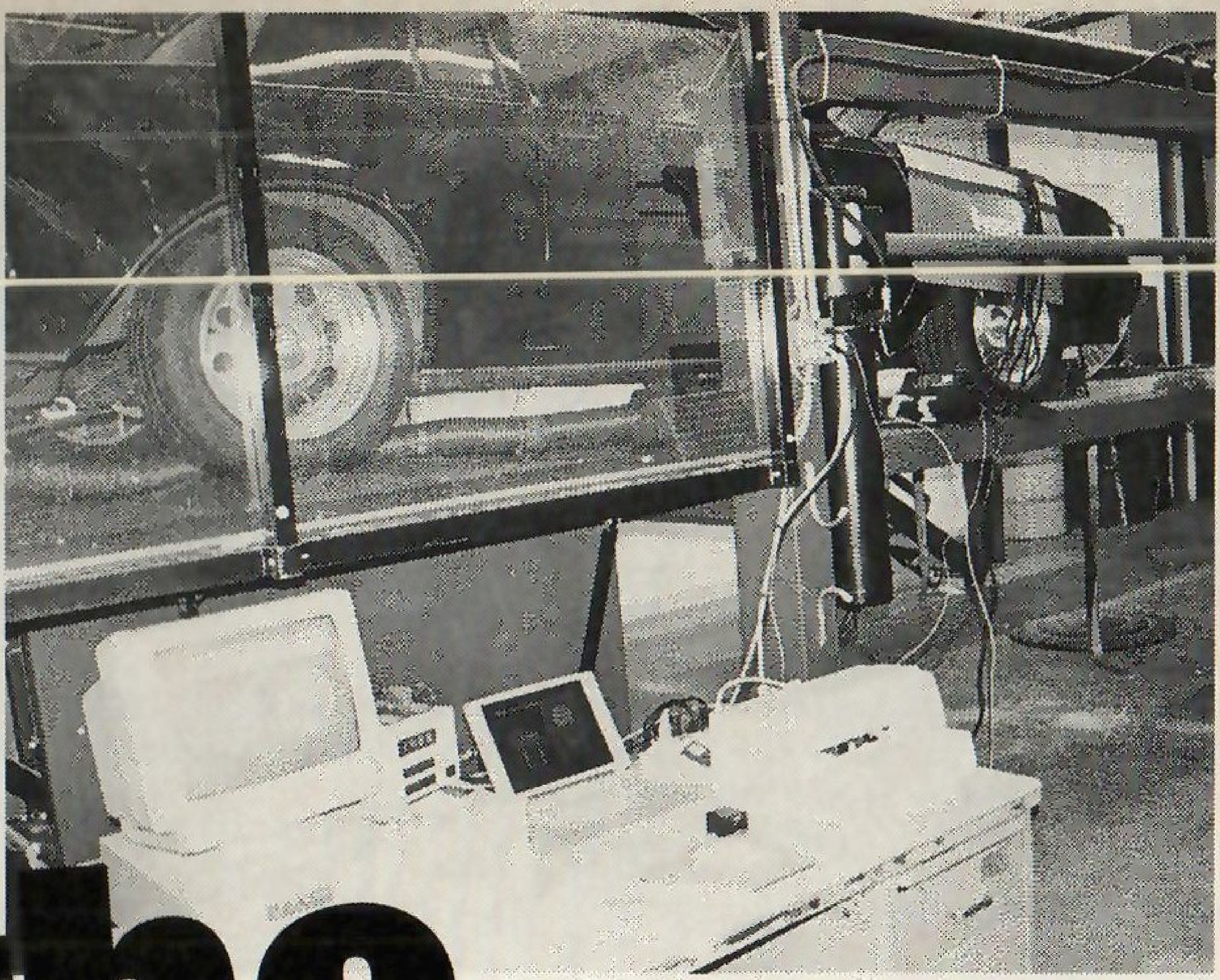
Through two different chip stages, full exhaust, a ram air kit, dual stage headers, their "Big Boy" intercooler, a 70mm throttle body, a bigger turbo, and Redline oil, Kenne Bell came through. Not only did the stuff work, but they also taught us why, through the use of various pressure and temperature sensor data taken during the dyno tests. These sensors are really a source of horsepower in themselves, as without them, you couldn't learn and tune to the specific fuel pressures required for making maximum power at the various upgrade levels.

Before we started the modifications, we took Middaugh's venerable GN to Mike Doyle's Buick Service for new plugs, a wastegate solenoid, a Kenne Bell oil pressure booster plate (to deliver sufficient cooling to the turbo, up 40psi to 60), new plug wires, and a 160-degree thermostat (Kenne Bell tells us all turbo Buicks like to run cool).

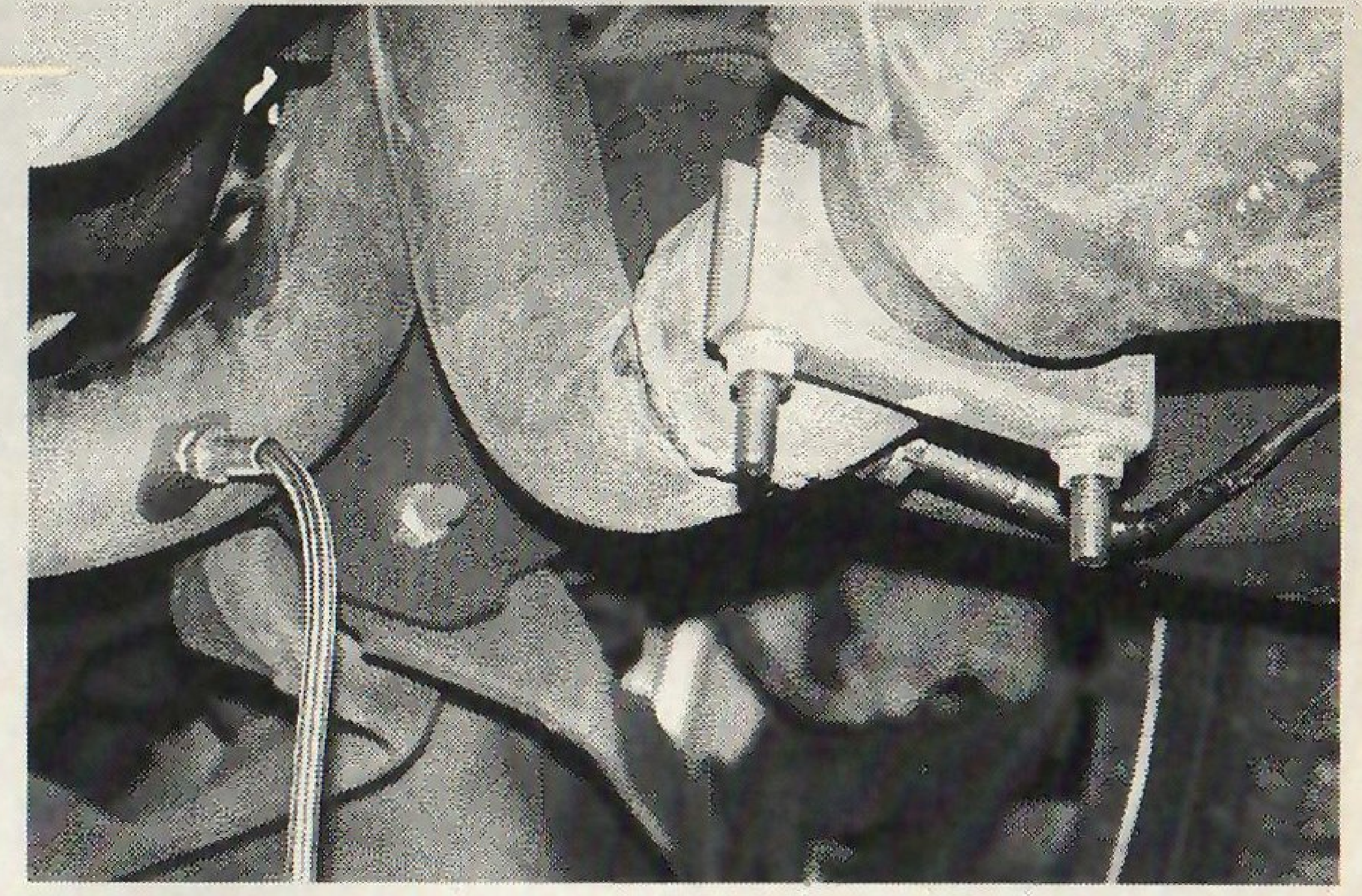
From there, Doyle



Remember when? Actually, then is now, as the turbo Buicks are still very popular according to all the major aftermarket players who still ship and develop many parts to this strong niche of enthusiasts, and you normally-aspirated guys can learn a bunch about tuning your cars by seeing what works on the turbo cars.



Kenne Bell was the first to use their Dynojet chassis dyno as a lift, which helps for on-the-fly parts changes and encourages back-to-back testing. Between Kenne Bell's in-house data loggers and the Dynojet's resident computer, we had wires going everywhere.



The probes are a big tuning help, as seen on the data logger screen where we took air/fuel reading for the Horiba sensors and turbo back pressure. Without them, it would have taken much more time for parts swapping and track testing.

the
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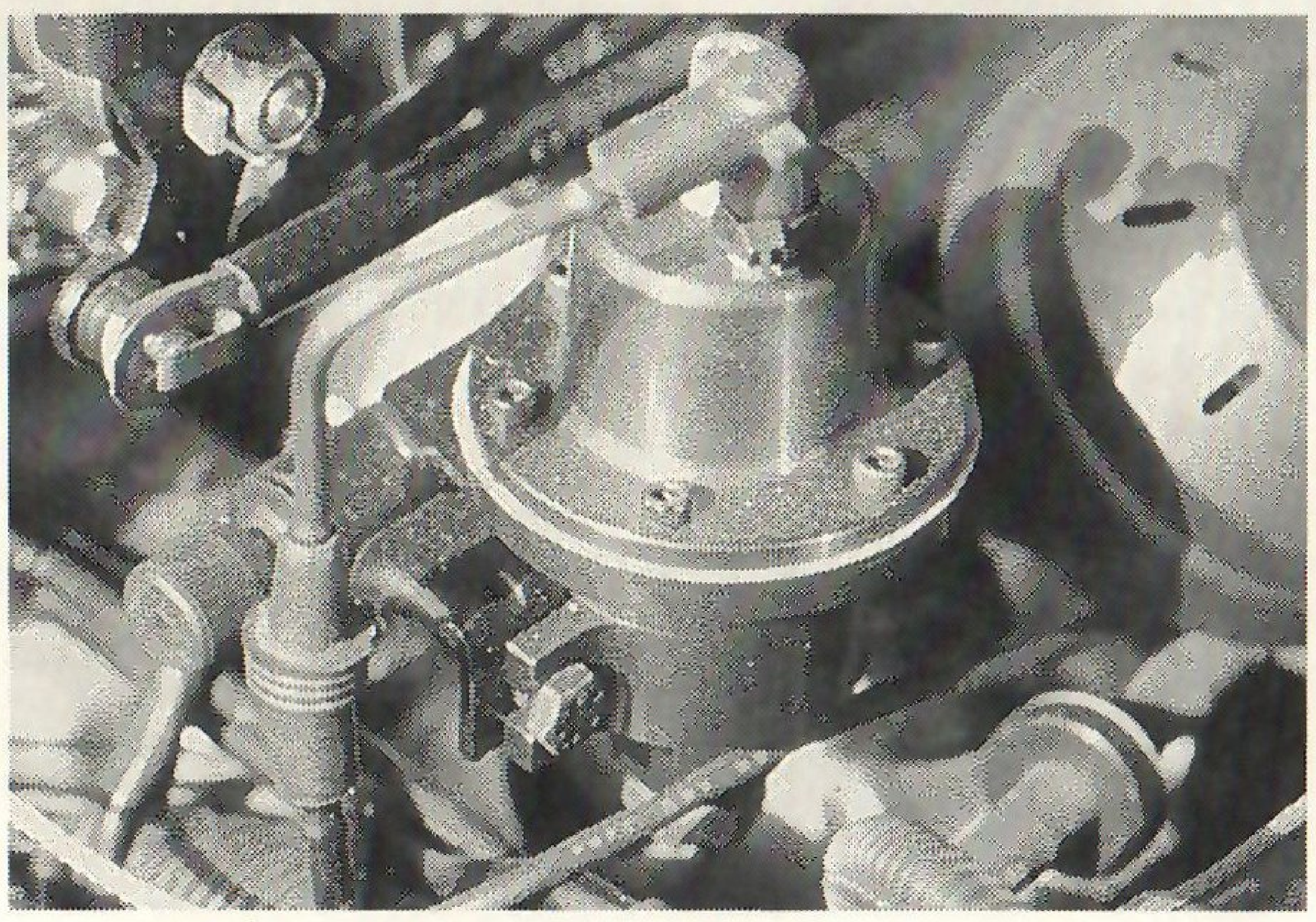
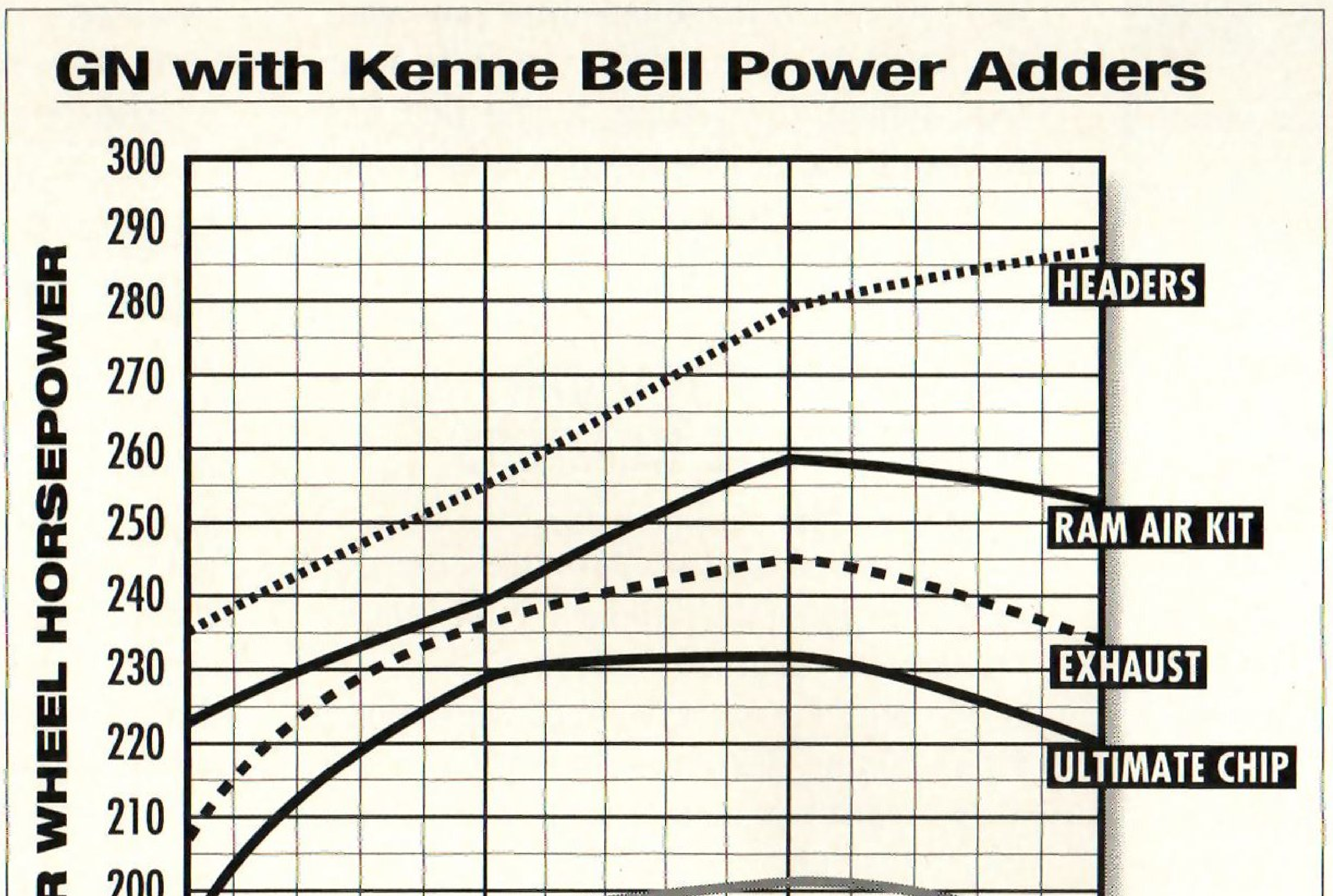


This billet aluminum fuel pressure regulator is a key to tuning a turbo-EFI car, as it works to control the air/fuel ratio. Regardless of what parts you choose to add from the buildup and resulting tests, you need this one and a fuel pressure gauge to go with it!

tested each cylinder's coil (remember, the ahead-of-their-time GNs had a computer-controlled coil ignition), checked each injector (which were cleaned and flowed back in the February 1997 issue of *PHR*), and set the throttle positioning sensor. Once he brought the car back to us, he tapped our pipes for the various sensors for testing, and Kenne Bell's resident computer engineer, Ken Christley, connected their 12-channel data logger (of his own design).

An initial dyno run netted 200hp at the rear wheels with an 11.7:1 air/fuel ratio at 42psi of fuel pressure. For the mods we'd be making, this fuel pressure would be totally inadequate, so we bolted up Kenne Bell's adjustable fuel pressure regulator and BOOST-A-PUMP. Now, fuel pressure can be used for tuning and, equally important, for saving parts! The BOOST-A-PUMP, which is a simple device that works on any electric fuel pump, speeds up the stock, in-tank pump delivery from 1 to 50 percent, depending on the adjustment and efficiency of the pump. Though these tests are all about getting the most power from clean, stock injectors, these changes will help to get the most out of what we've got. Do you really want to add a noisy, external pump or take apart the fuel tank to replace the OEM pump? We didn't think so.

Incidentally, don't be discouraged by the lack of traditional engine dyno results. The chassis dyno is quickly becoming the standard in the aftermarket for obvious ease of use, and can be easily factored back to traditional figures by dividing the Dynojet figure by .8. Here's our example: Bill's GN makes 200 rear-wheel horsepower — 200/.8=250 engine horsepower. It may be a little hot, but it's the changes which are most important.

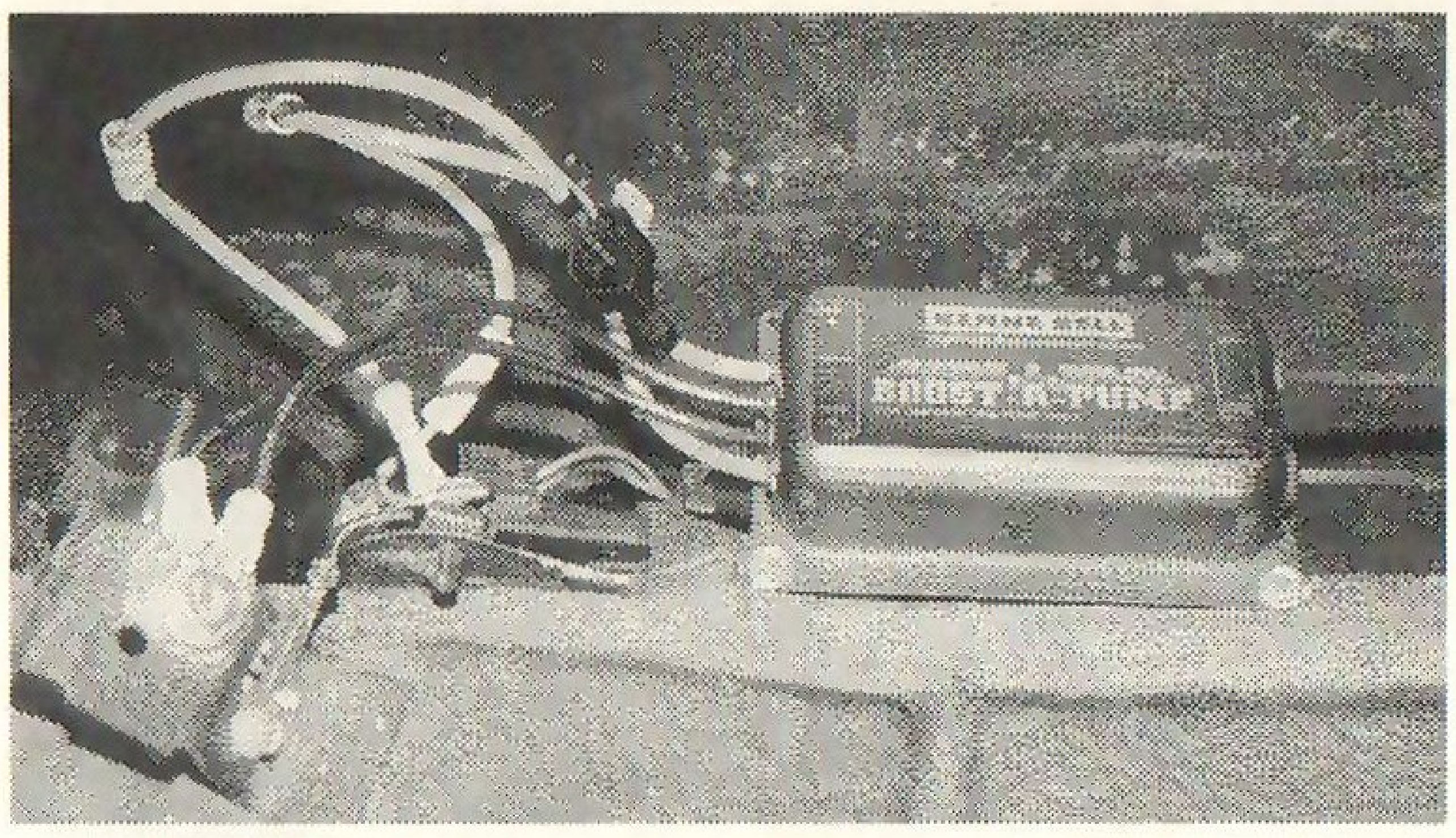


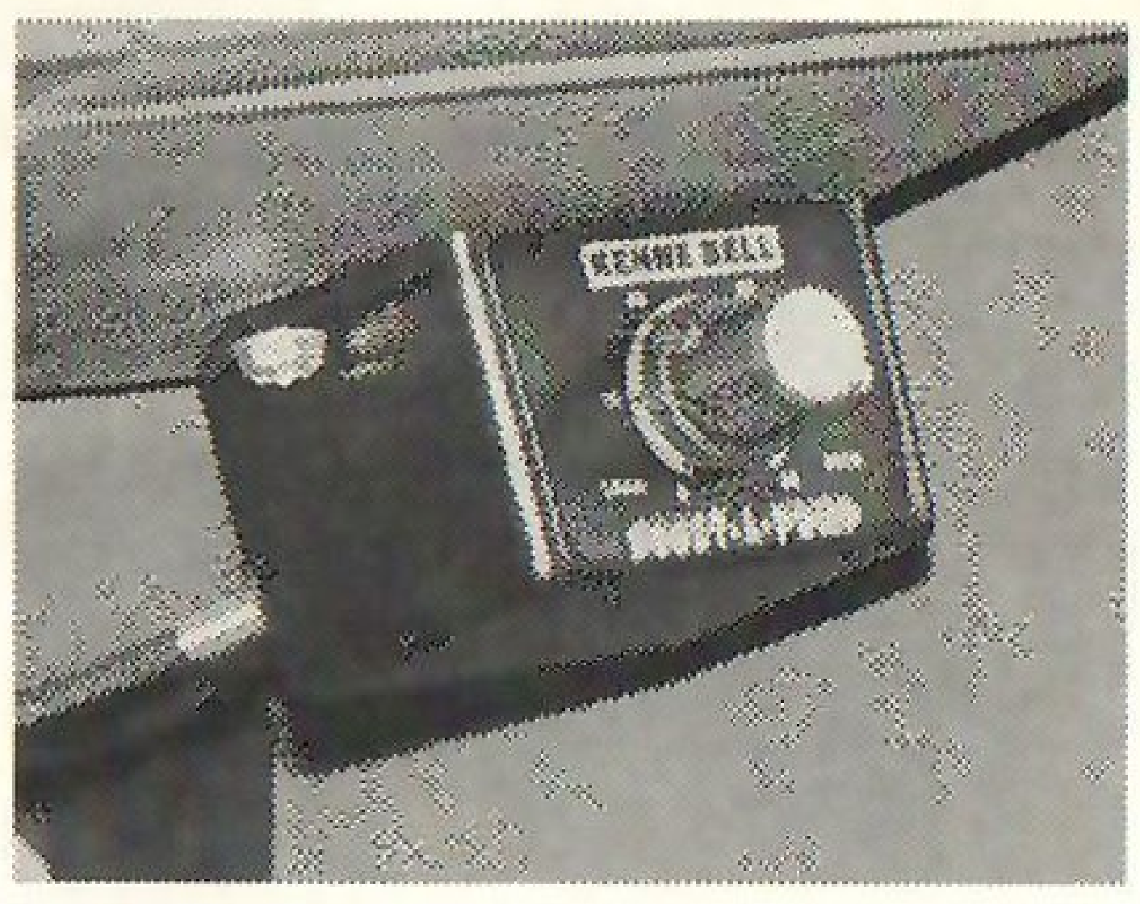
GN with Kenne Bell Power Adders

STEP ONE
COMPUTER CHIP = 231HP

We've found the cheapest and easiest way to make safe power is through replacement of your stock computer chip. For about $130, a Kenne Bell Ultimate Chip (which is an inappropriate name, since there's a hotter chip we'll tell you about next month) raises boost from 12psi to 17psi, in turn modifying the fuel tables and altering the fan's on/off settings.

Our tests showed those exact changes and some interesting statistics. The data logger showed 5.9psi of exhaust pressure and 35psi of turbo back-pressure, which compared with 17psi of boost, means the turbo as a power adder equates to about 50-percent efficiency. That's far greater than either a roots blower or centrifugal supercharger. At wide open throttle, we found the best power by adjusting the regulator and BOOST-A-PUMP to 54psi of fuel pressure (for an air/fuel ratio of 10.98:1). With an increase of 29hp and a safer burn, the chip, booster, and regulator are already paying big dividends.

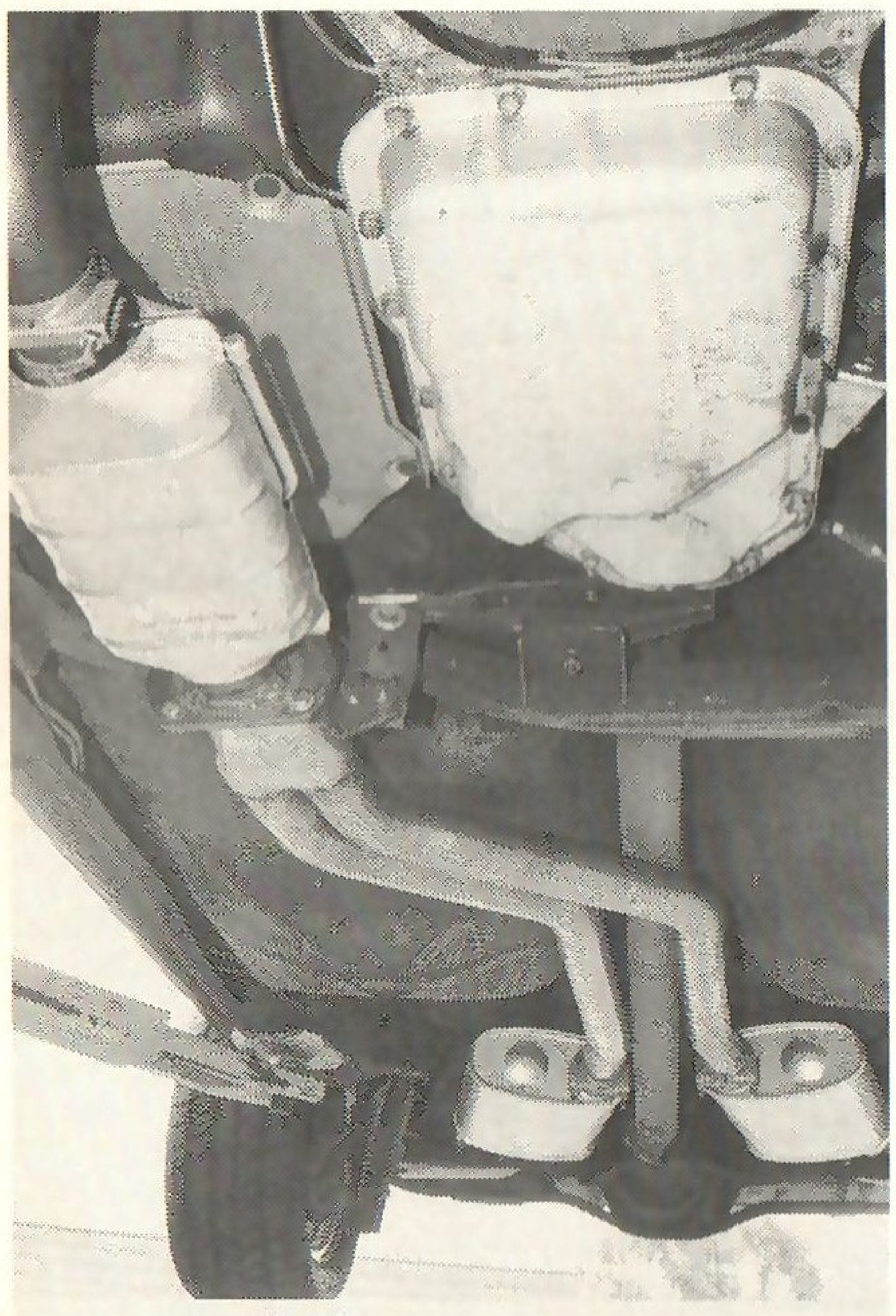




This ingenious little device saves you tons of time. Kenne Bell's BOOST-A-PUMP speeds up your stock fuel pump (to its highest, built-in capability) with a cockpit-adjustable knob. Combined with the regulator, you can get the flow and pressure required by all this air we're learning how to pass.

STEP TWO
EXHAUST = 245 HP

If your T-Type or Grand National has anywhere near as many miles as our old man Middaugh's, it's gonna need a new exhaust and catalytic converter anyway. Changing to Kenne Bell's exhaust system creates another 14 ponies and some interesting numbers in result.

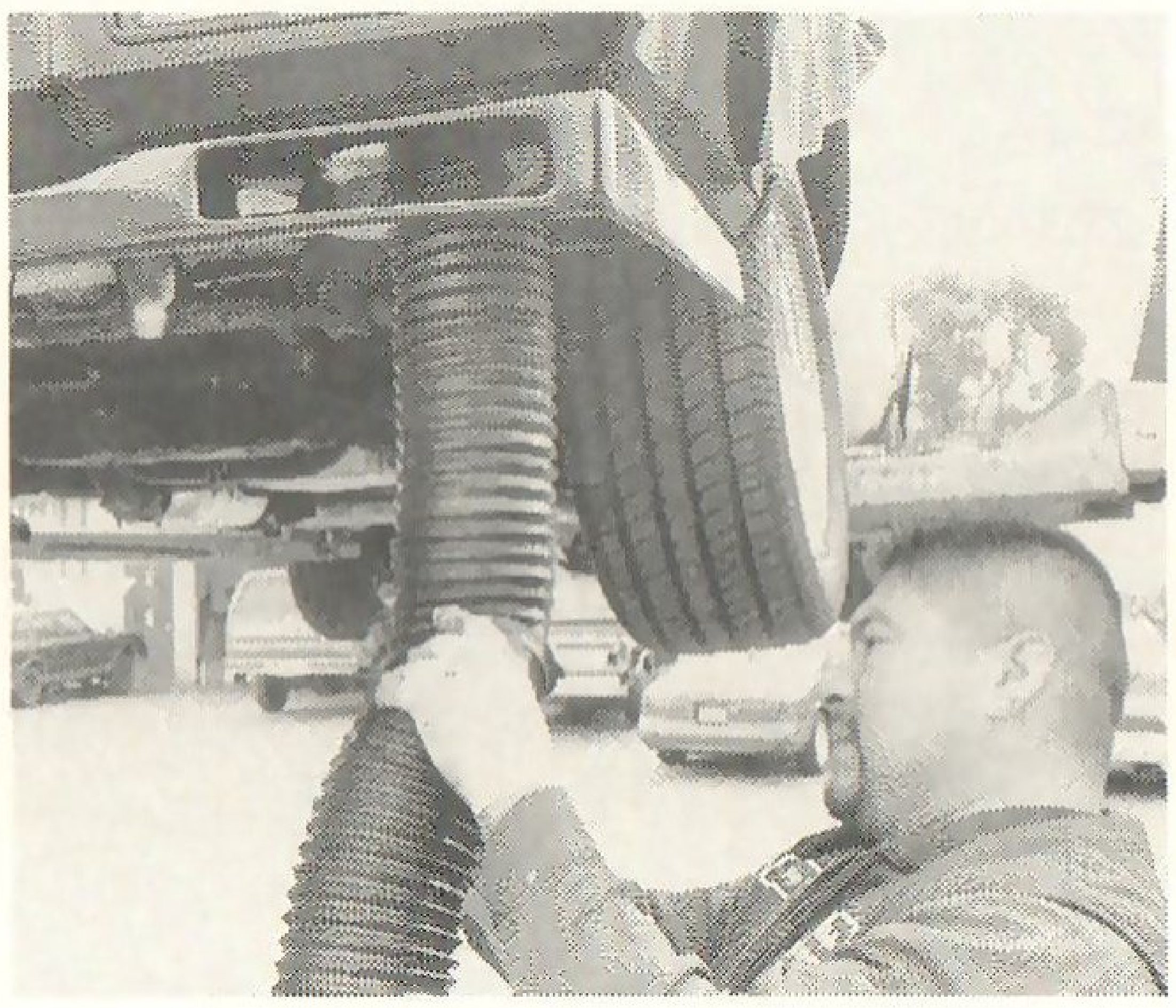


Back pressure dropped from 6psi to 3psi (on a scale where one pound is thought to equal five horses). Turbocharger back pressure was also lowered by an equal amount. This 14 hp gain leaned the air/fuel ratio from 10.98:1 to 11.42:1 — while these figures don't do you much good by themselves, know that 10 pounds of fuel pressure equals about .6 to .8 in air/fuel ratio. After making an exhaust change like this, expect a need to bump your fuel pressure on either the regulator or electric booster.

STEP THREE
RAM AIR KIT = 258HP

This may not surprise you, but the ram air kit (including a filter, hose, canister, and scoop) is Kenne Bell's number-one selling item for the turbo Buicks and Typhoon/Syclone series. We tested the kit on the Dynojet both with only the filter and with the hose, canister, and scoop attatched without finding any difference - a 13hp gain was scored regardless of configuration.

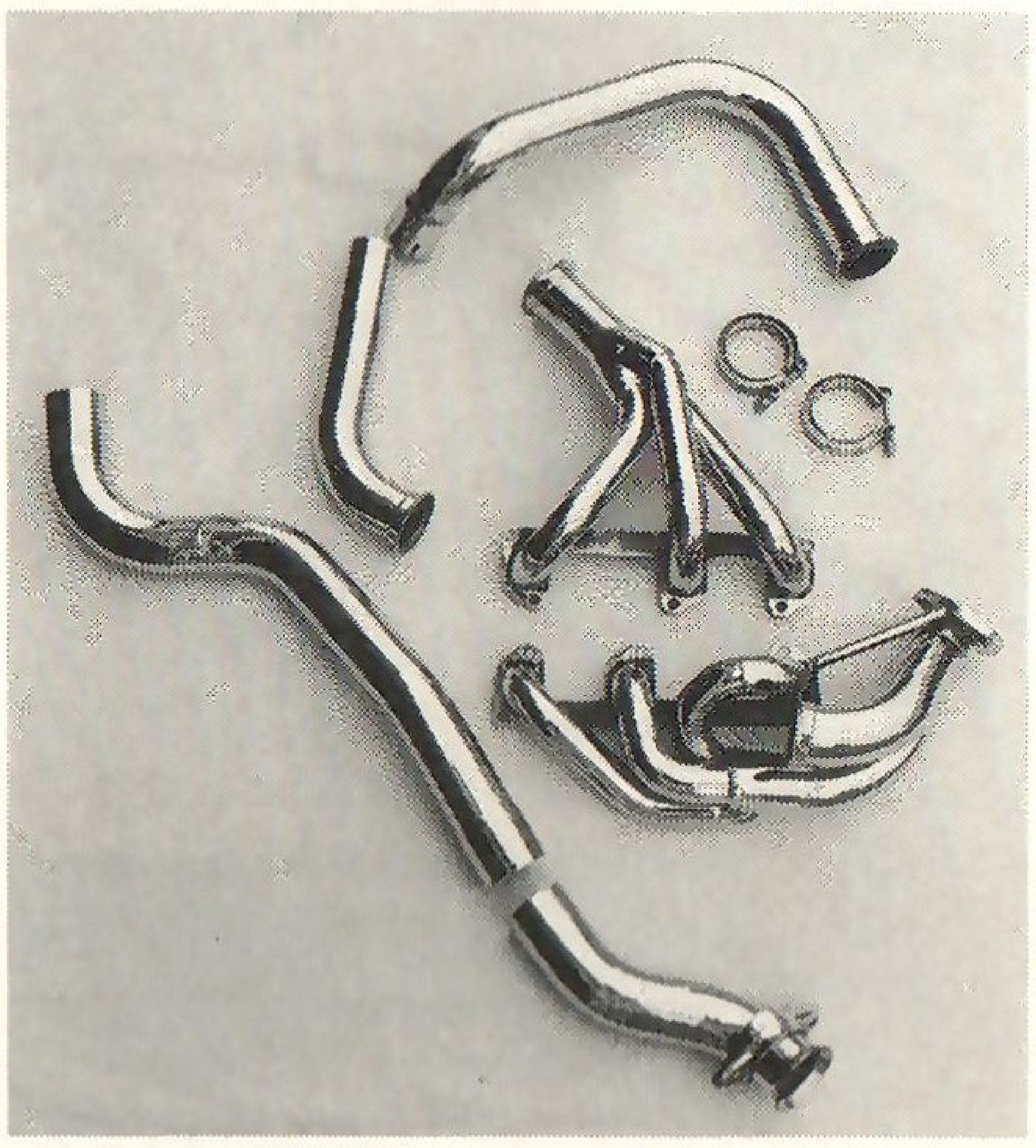
These numbers can be a little fishy, since temperatures (and resulting horsepower reading) can vary depending on if the hood is up or down. In our case, we were forced to make our dyno runs with the hood up. As a rule of thumb in your own tuning and testing: Kenne Bell has found that a 10 degree change in intake temperature equals one-percent in overall horsepower capability.



STEP FOUR
DUAL STAGE HEADERS = 287 HP

With three shorter, passenger-side primaries to spool the turbo and three longer, driver's-side primaries which join at the turbo and create a venturii scavenging effect, Kenne Bell's headers are an original design with numbers to prove their merit. Big, 1/2-inch flanges are leak free and eliminate the need for gaskets. Though space isn't a strong point under the hood of this GN, we've seen much worse and struggled harder with a header install.

Our air/fuel ratio was leaned to 12:1 by the headers and our required fuel pressure to make this much power is only up to 56psi (which isn't far from just after the chip change). Remember these fuel pressure figures, as you don't have the benefit of an expensive Horiba out on the street to come up with an appropriate air/fuel mixture (and resulting fuel pressure to tune by). Use these figures as wide-open-throttle baselines — we can attest to them being fairly close, as long as your mods are similar to these at the particular steps.



MORE PONIES NEXT MONTH

So far we've taken you from 200hp to the rear wheels all the way up to 287hp, and we haven't even scratched the surface. Next month we'll be getting into a new intercooler which will push us well over 300hp (remember, that's nearly 400hp on a typical engine dynomometer) and the throttle body, combined with another chip and turbo, will take us into the ludicrous power zone. ▩

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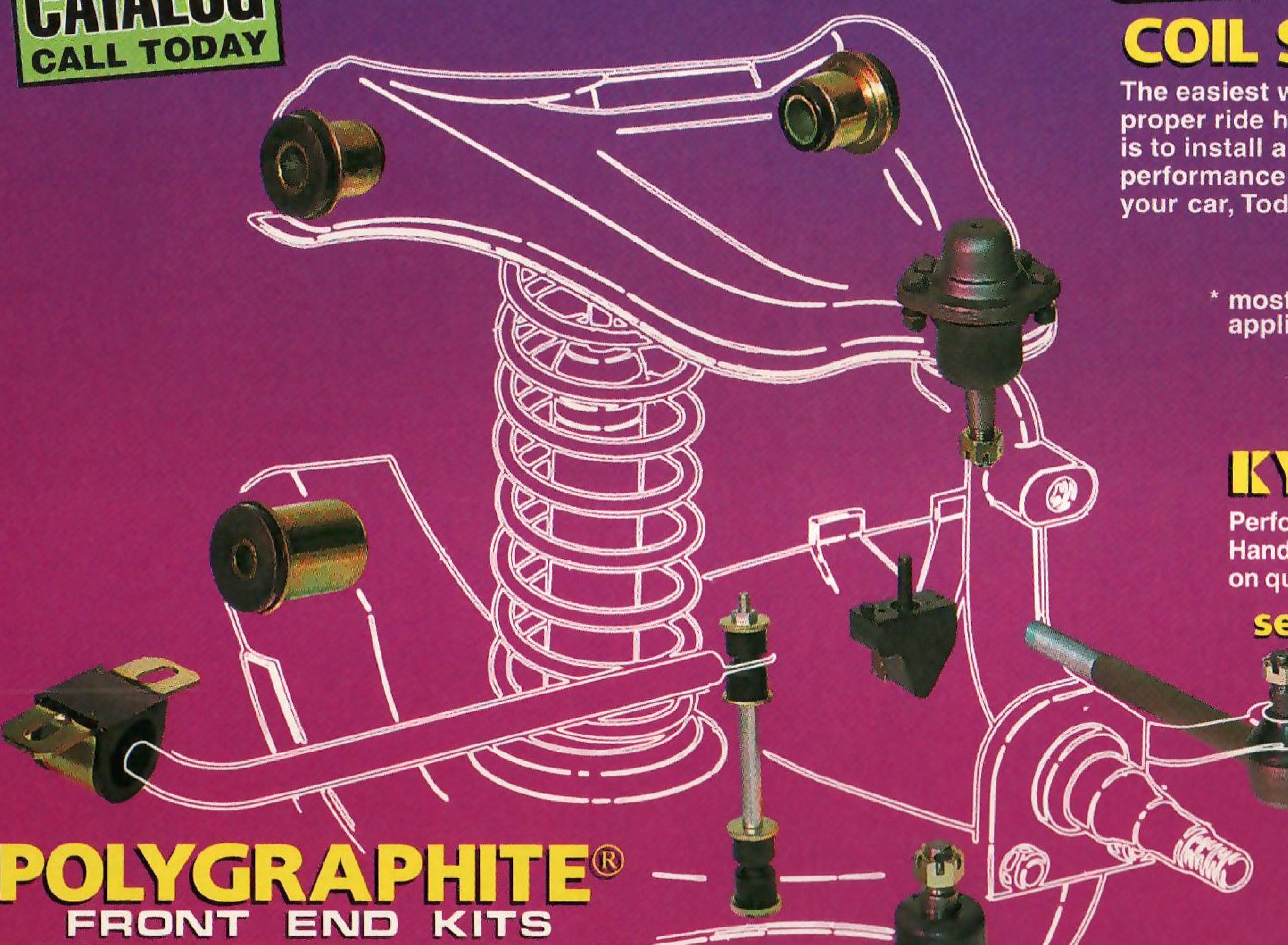

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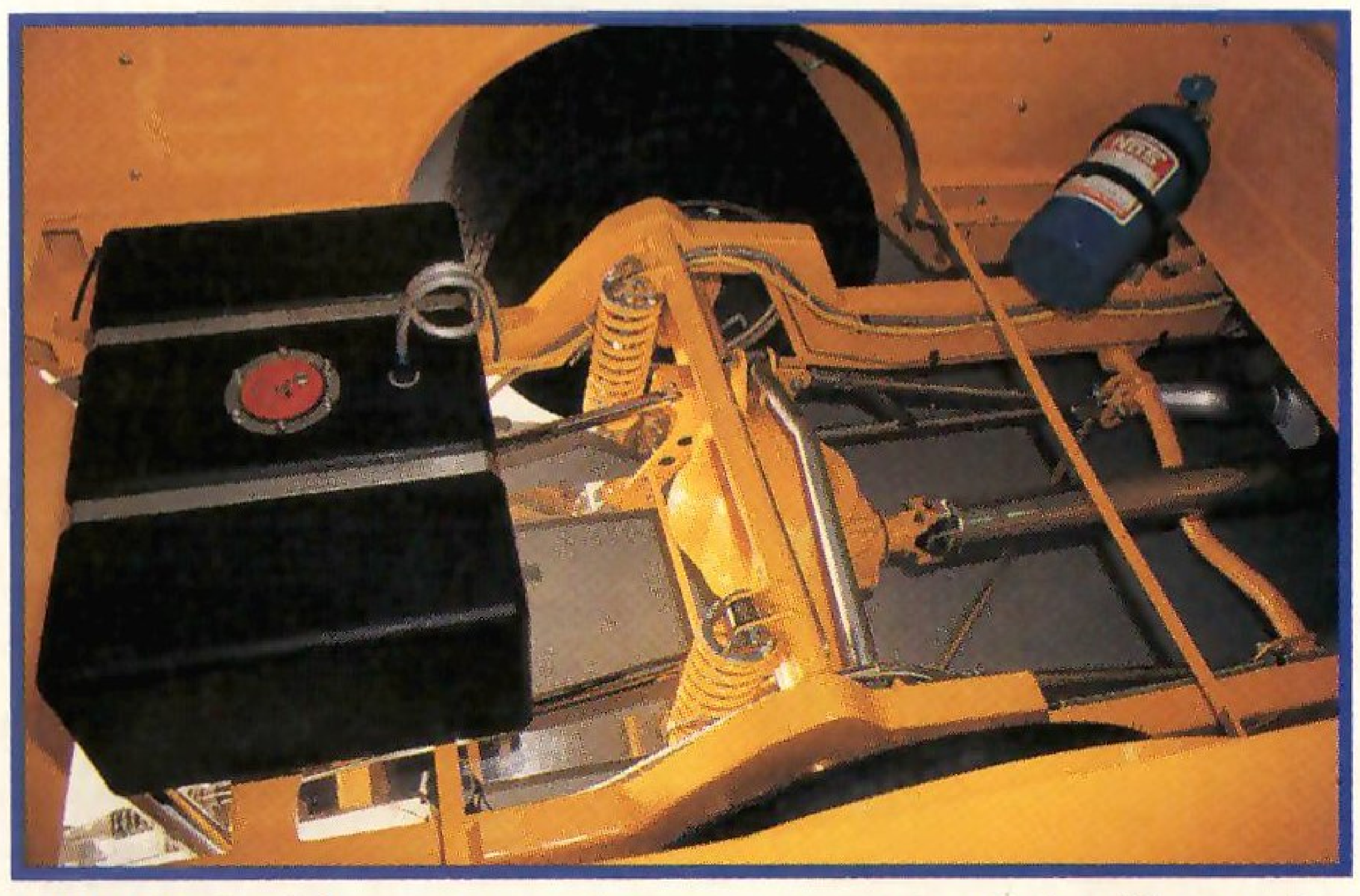
B-B-B-B-BAD

Bad to the Bones

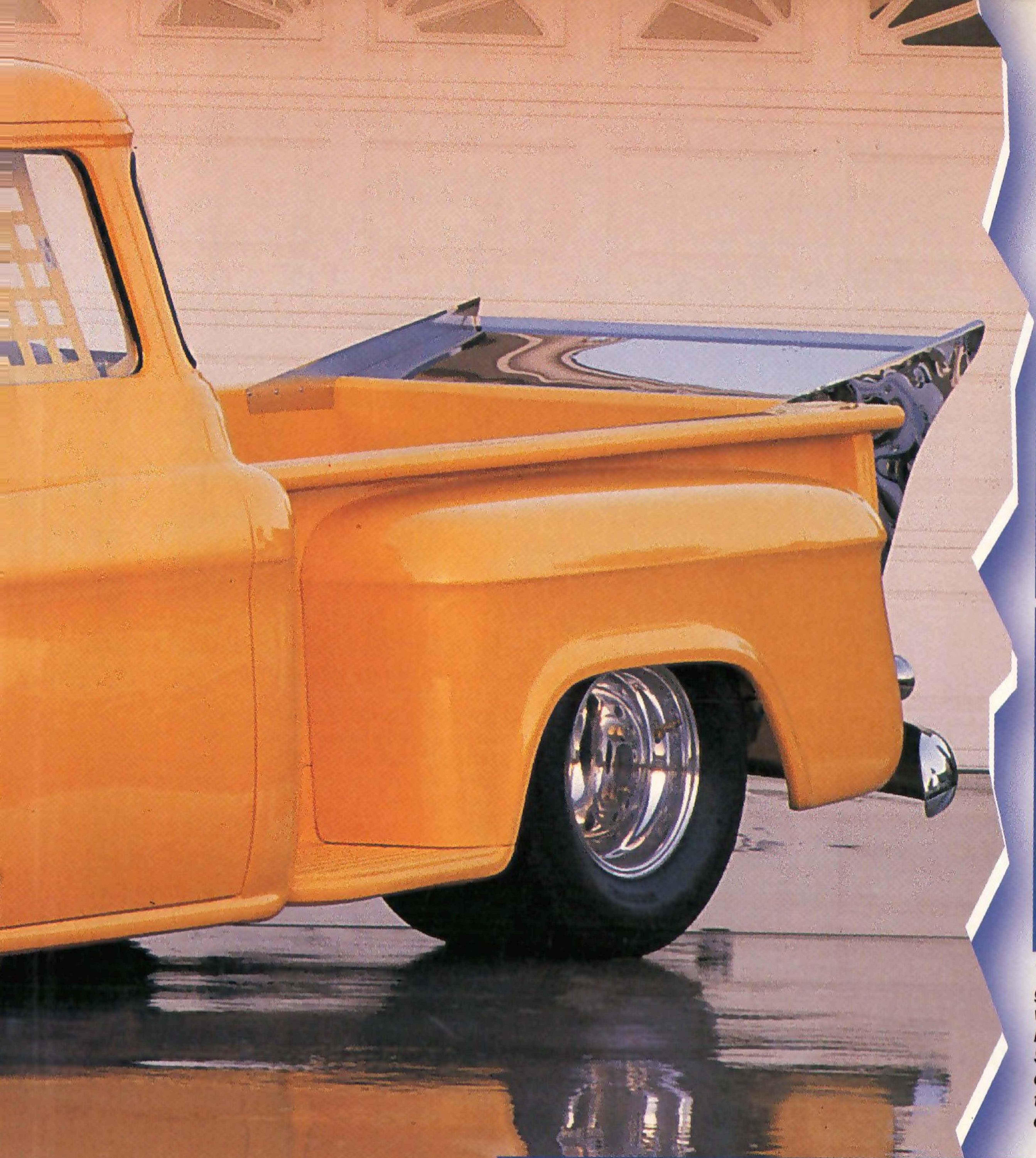
TEXT BY RANDY FISH • PHOTOS BY BRIAN McCORMICK

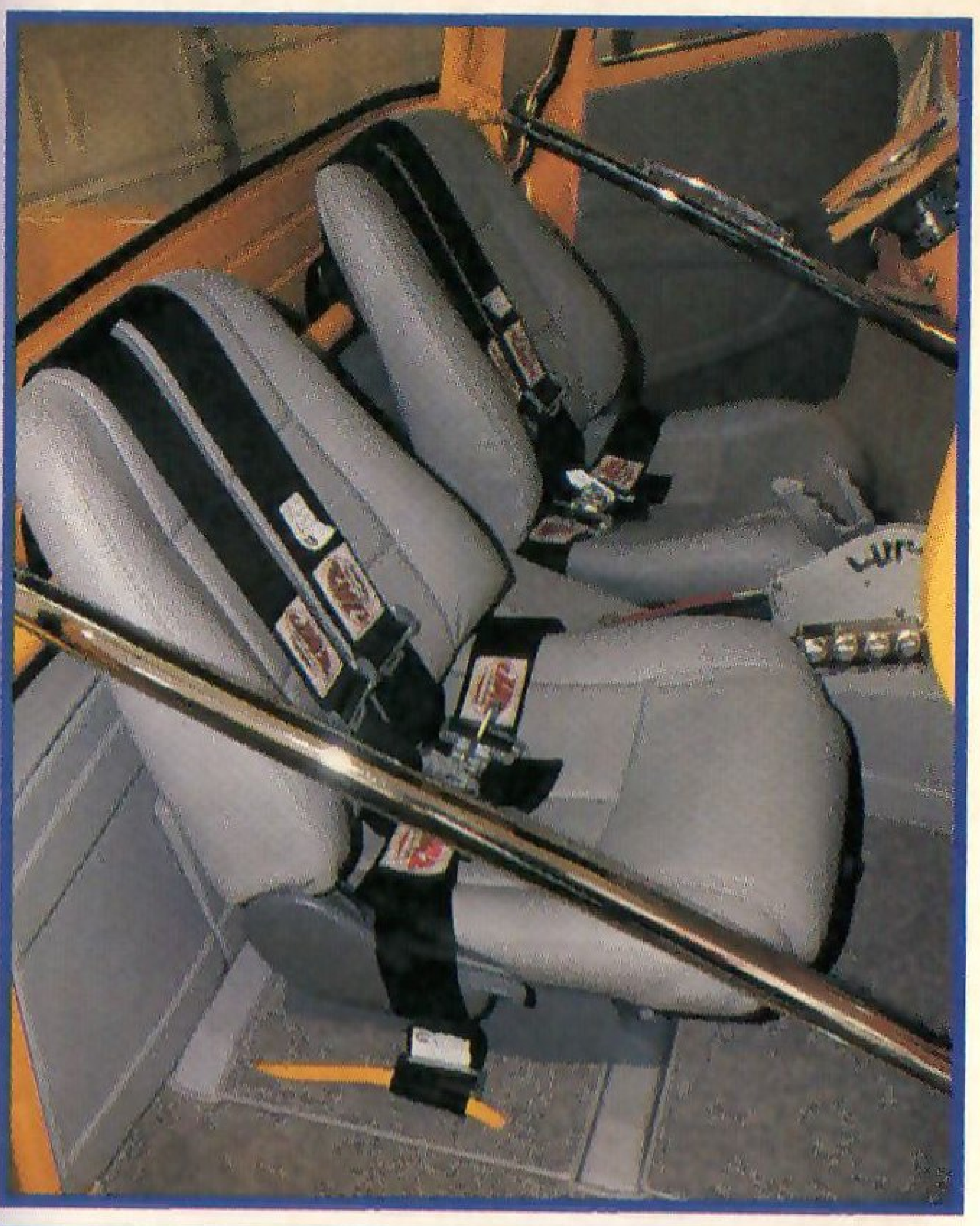
No, Stuttering John is not responsible for our title. It's just a little rock 'n roll throwback from George Thorogood and the Delaware Destroyers. It seemed to fit this '55 Chevy Pro Street pickup belonging to Derek McCowan of Visalia, California. Unlike the famous song, we call this one "Bad to the Bones," referring to the chassis as the bones (just like the race car guys). While many think Pro Street cars seem to get all the attention, the hauler shown here speaks volumes for high-tech truck lovers.

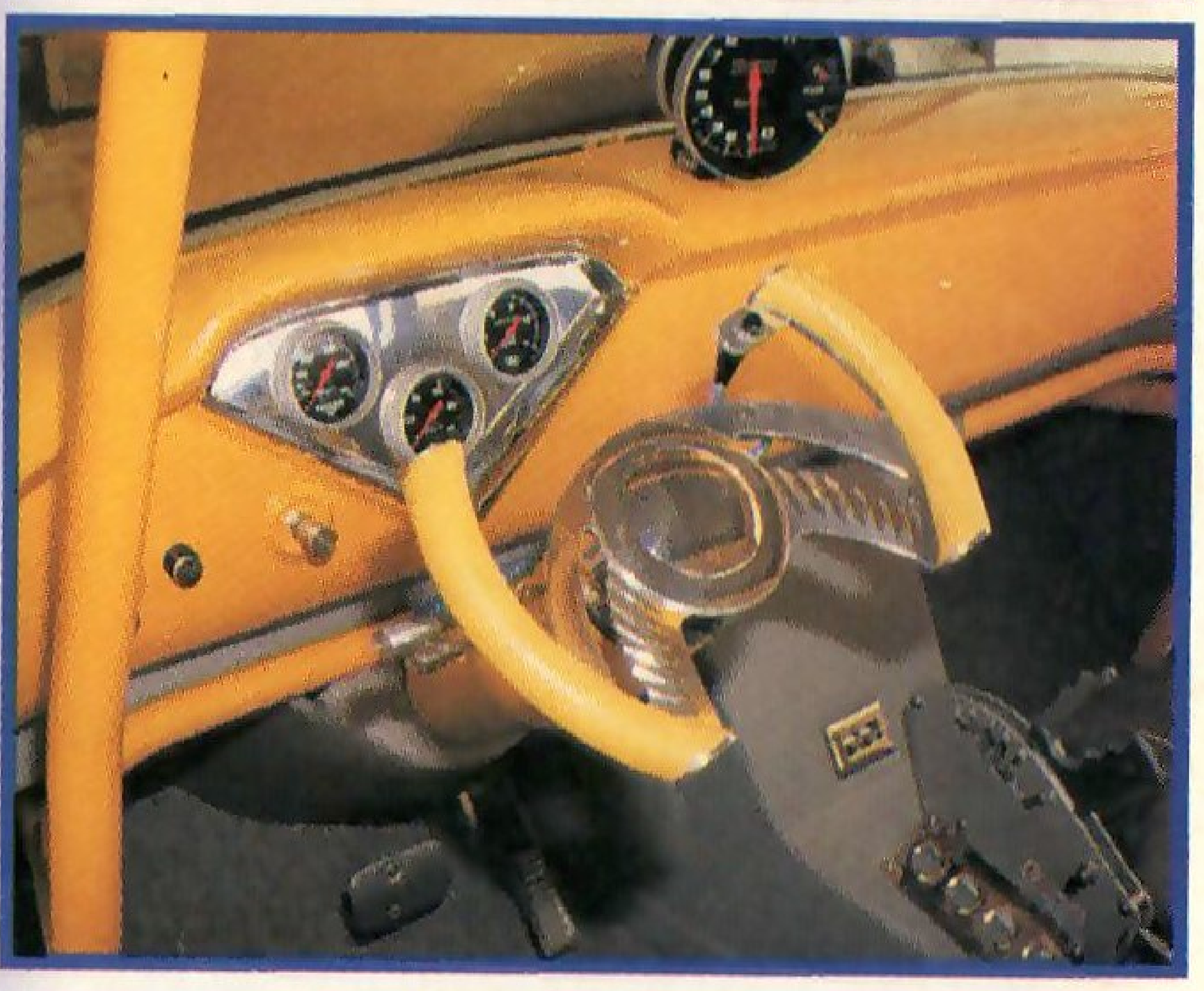
The original chassis received some healthy modifications. The rails were fully boxed and smoothed, then a '79 Firebird front clip was grafted in place (employing Koni coilovers). Once the rear section was narrowed and C-notched, a Ford 9-inch housing was located with coilover shocks and ladder bars from Chris Alston Chassisworks. The housing itself is equipped with a Detroit Locker and Summers Brothers axles. Cragar Superlite wheels add some sparkle while those big Mickey Thompsons lend attitude in the rear.



With the bed floor removed, more exceptional detailing and workmanship is revealed. After a "serious" narrowing, the Ford 9-inch housing is located via ladder bars and coilovers from Chris Alston Chassisworks. The hefty C-notch and new crossmembers are also evident. Don't think those chrome wheelie bars are just for looks, either. We'll bet their casters have hit the pavement hard on more than one occasion.

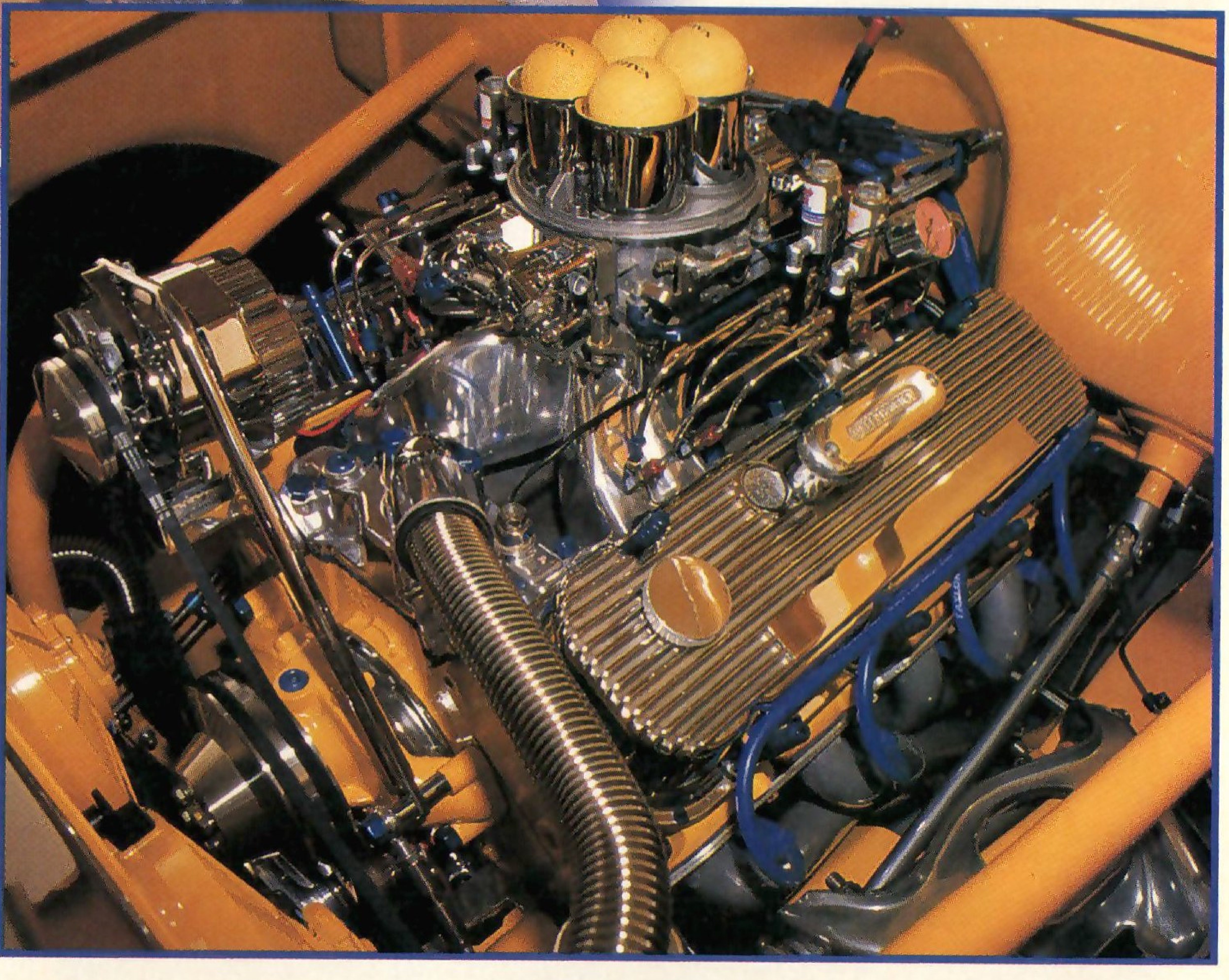






This is the view Derek gets during wide-grinning joy rides. The cut-down steering wheel adds a different look, but blends right in with the tasteful interior. With many Pro Street vehicles having rather stark driver's compartments (like tinwork), this one has the right mixture of racy attitude and contemporary style.

→



The visual attitude is easily backed up by a big brute 427 Chevy, fitted with a steel crank, polished rods, Ross 13:1 pistons, Howard's cam, a Milodon nine-quart oil pan, rectangle-port heads, Manley valves, and Crane springs. A Holley 1050cfm Dominator delivers the fuel charge through a Dart intake, assisted by a fogger setup from NOS. That charge is lit by an MSD 7-AL ignition system while Hooker headers usher the waste through a set of Flowmaster mufflers. Pushing approximately 700hp on the squeeze, power is transferred through a TH400 from Performance Trans which uses a Summit Racing shifter to select the gears.

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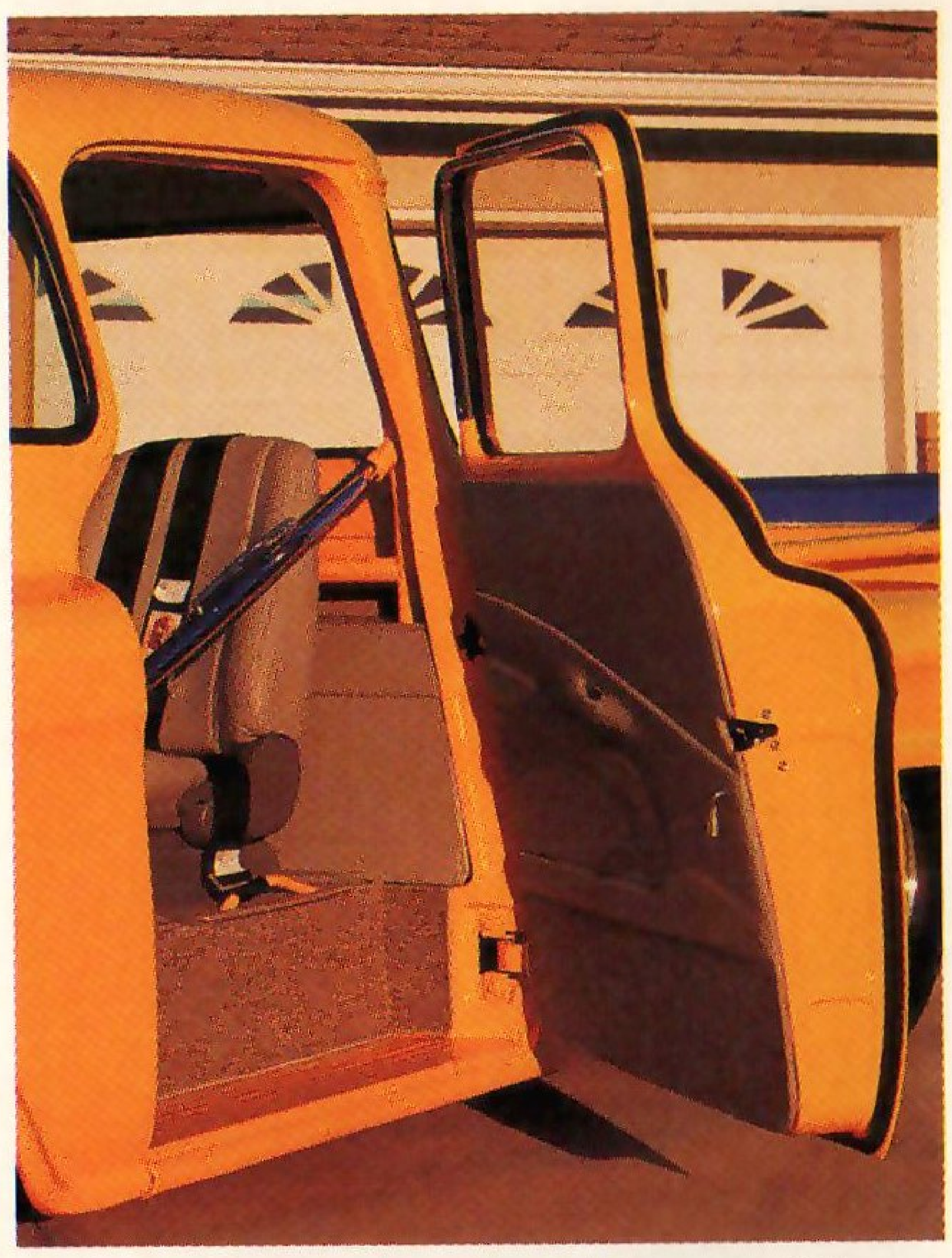

Suicide doors? Why Not? It's one of the most difficult conversions to accomplish, but the results can be stunning (as shown here). More mods came in the form of shaved handles, drip rails, and trim, one-piece door glass, and much, much more.

With a stout powertrain and choice chassis, the b-b-b-b-body had to be just as b-b-b-b-bad! Starting with a well-rusted beater, most body panels needed to be replaced. Then the tricks began, including: sectioning the hood, engineering and mounting the suicide doors, shaving the handles, trim, and drip rails, adding one-piece door glass, welding the seams, narrowing the bumpers, and filling the bed rails. A fabricated rolled pan blends into the molded and reversed tailgate which now serves to anchor the stainless steel wing. A bright coat of taxi-cab yellow allows this hauler to attract even more attention — 'ya just can't miss it!

The interior confines complement the already contemporary theme. Derek completely smoothed the dash, but retained the stock cluster shape, fabricating a polished insert to house the Auto Meter gauges. Pontiac Grand Am bucket seats were re-covered at Upholstery by Brent, along with the custom-made console, door panels, headliner, and rear panels. Wilton wool carpeting covers the floor, adding a refined appearance similar to the most exotic European luxury cars. Other amenities include the roll cage (with chrome swing-out side tubes), JAZ belts, and a modified Weld steering wheel. It's easy to see how this much workmanship can make b-b-b-b-bad be so g-g-g-g-good!

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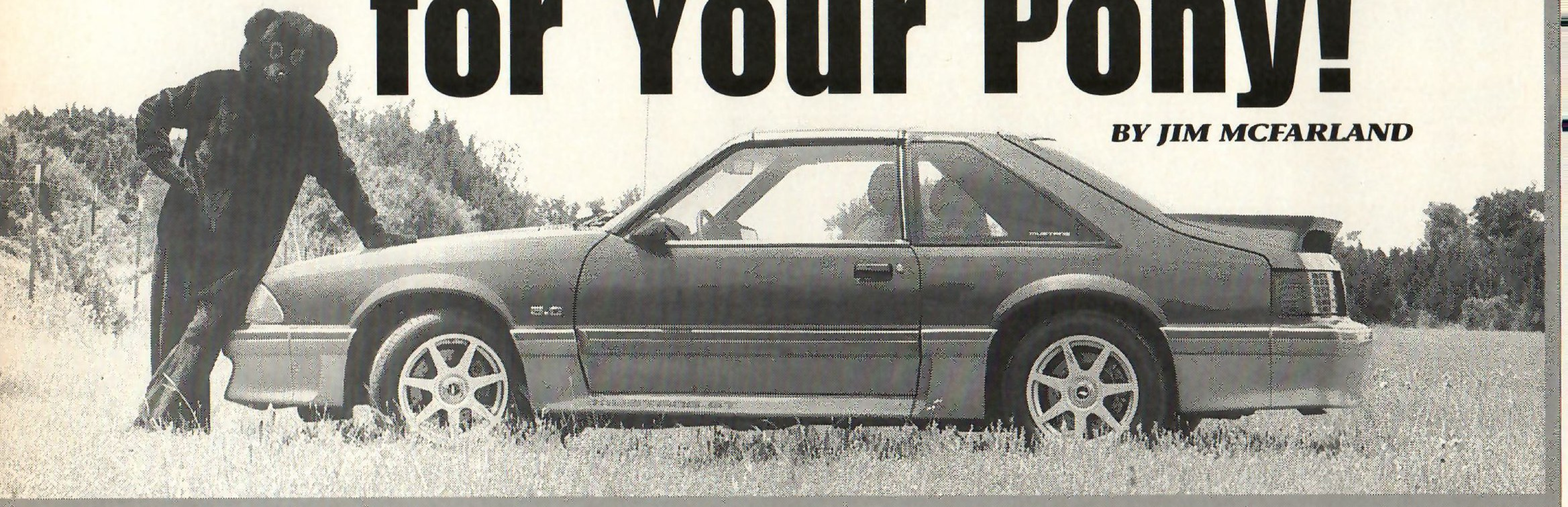


BY JIM MCFARLAND

Author's note: From a personal perspective, 30-plus years of exposure to "bolt-on' parts and systems tends to define what this term so often means to the "driveway, do-it-yourself" enthusiast. In this case, everything but a clock to time the installation is included in Baer's truly bolt-on kit. It leaves even the most experienced mechanic with a new awareness of what a thought-through box of parts can really provide. This time, you get the brakes... in more ways than one.

Find the nearest winding mountain road and start huntin' for 'Vettes! This combination of TSW wheels, BFGoodrich "paws" and Baer stopping parts will boost your urge to don the helmet, pull on the gloves and opt for what amounts to a slot-car ride in your late-model Mustang. Go ahead, wipe that grin from your face. This is one bolt-on package that fills the bill!

Baer Racing brakes, TSW Wheels, and BFGoodrich tires are the bolt-ons in a serious tale of whoa!

In the paragraphs that follow, we'll chronicle the steps taken for this upgrade transformation. Using the talent and facilities at one of South Central Texas' finest repair and high performance shops (Pro-Motion Machine in Round Rock, Texas), owner Keith Stamper and crew pitched in to show you how this particular project came to life. Parts installation tips and "bewares," hard data and graphics that indicate the car's new braking performance, and a smattering of photos to guide you through the process follows. "Driveway mechanics" will relish in the results of this bolt-on experience.

BASELINE BRAKING PERFORMANCE

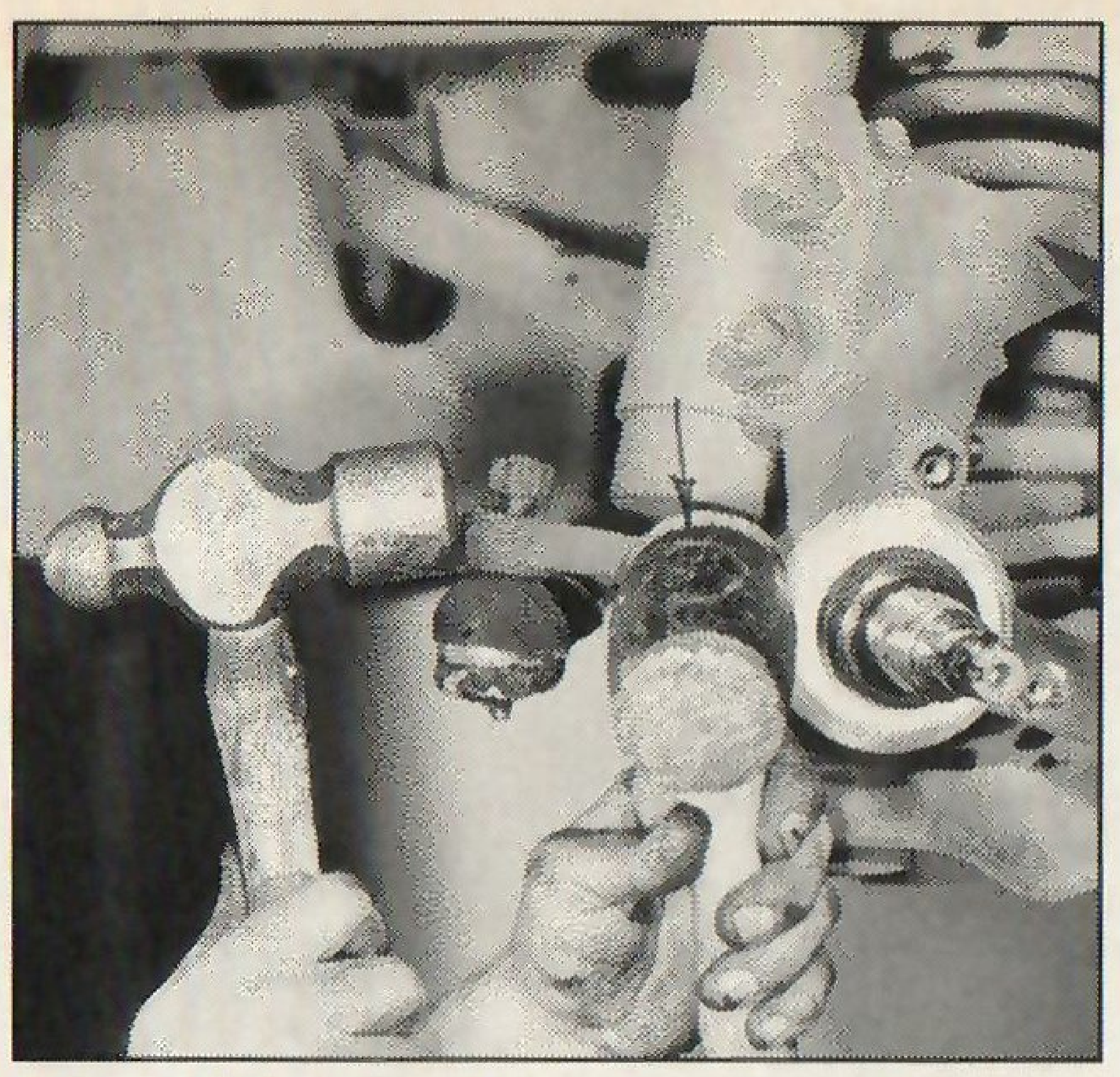
This 1987 5.0L Mustang was produced with a disc front and drum rear brake assembly. Out of a controlled testing environment (Southwest Research Institute), braking performance is indicated in the accompanying charts. One chart details the data provided by Baer Racing, Inc., derived from their testing procedures, the other displays results gathered by the author in an attempt to both validate and compare Baer's braking performance numbers as a more "independent" source. Both sets of data show performance of the stock Mustang's disc/drum system as compared to that of the Baer parts upgrade. It is interesting to note that both sets of data are quite close.

In particular, note the effects of heat buildup as generated during repeated high-speed braking with the stock system. Later, you will discover one of the benefits of the Baer kit is its ability to maintain stopping performance in the face of substantially increased heat accumulation within the system.

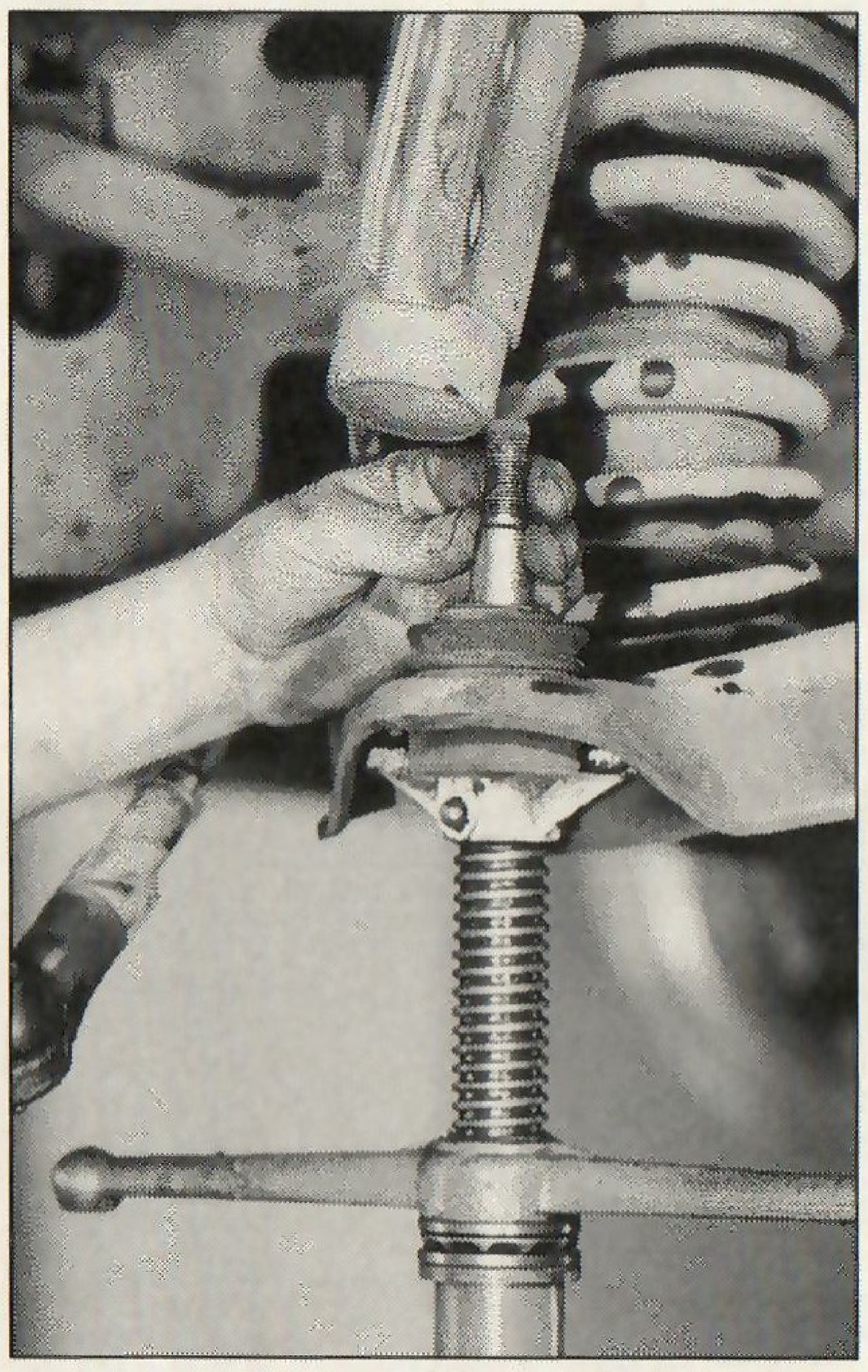
Here Pro Motion's Allen Bunch is shown bleeding the stock system of all old fluids and possible contaminants prior the kit's installation (and replacement with fresh Dot #3 fluid).

POST-INSTALLATION BRAKING PERFORMANCE

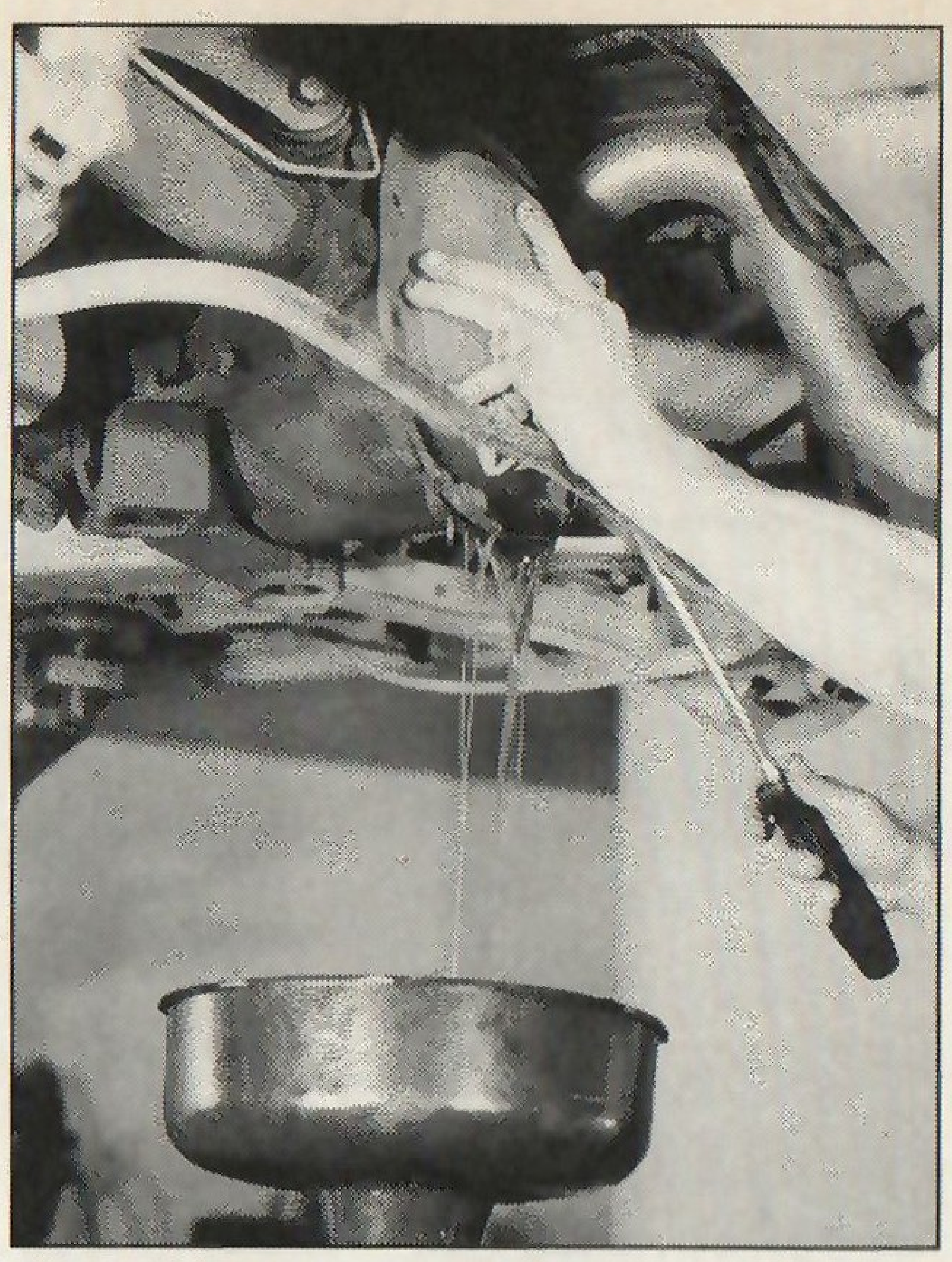
Whew! A quick glance at the "new" data provides clear indication of the performance provided by this braking package. "Baer claws" indeed! Another data perspective comparing the percentage of stopping improvement shows the Baer system to reduce these distances by as much as 31 percent (60-0mph stops com-



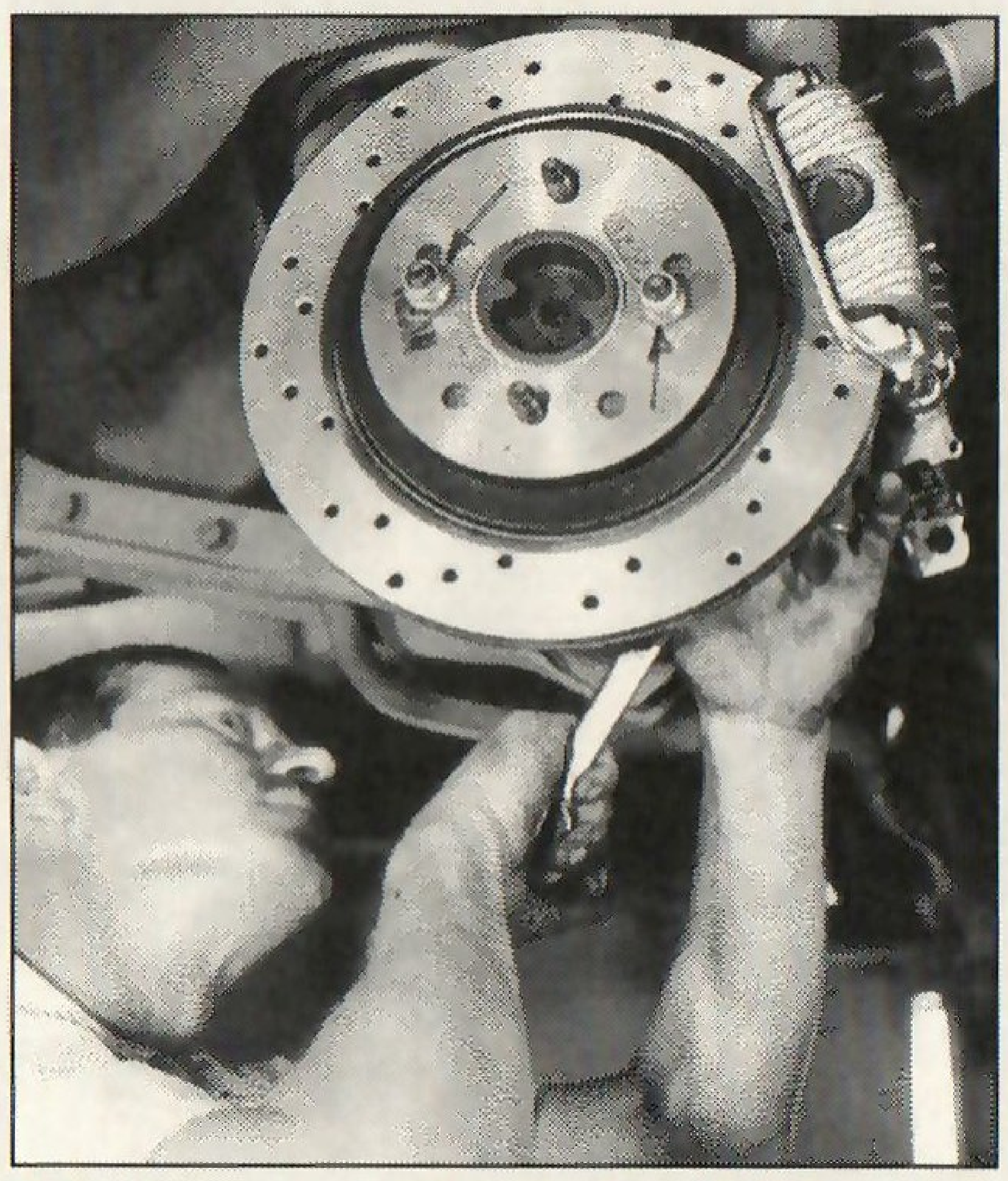
When dislodging tie-rod ends, make sure to back up the hammer blows to prevent damage to other suspension parts (note arrow).



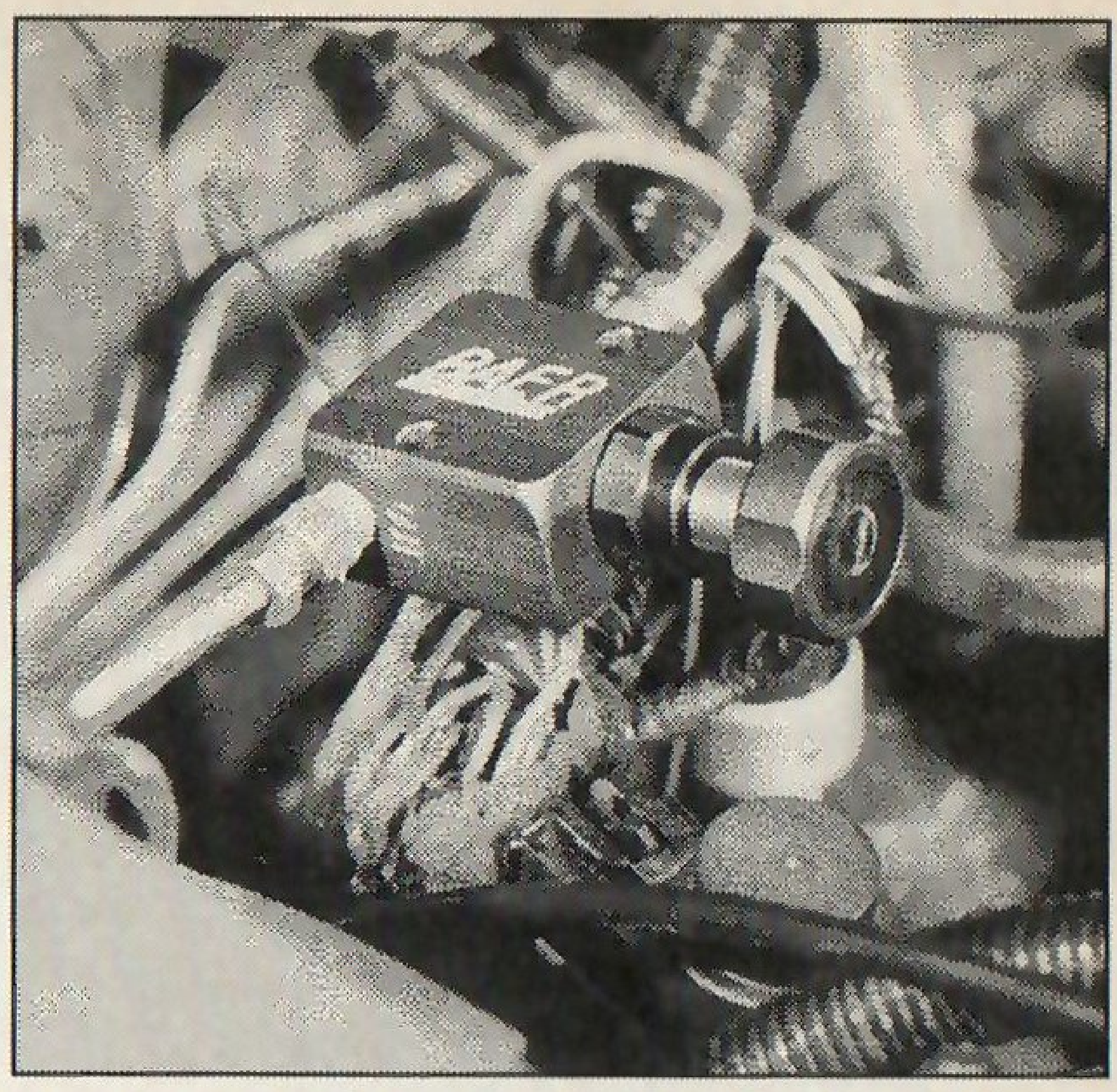
During installation of the Baer kit, it's wise to examine other suspension parts (tie-rod ends, ball-joints, etc.) for possible replacement. This is a convenient time to update worn parts, especially since re-alignment of the vehicle's front end assembly (following kit installation) is recommended.



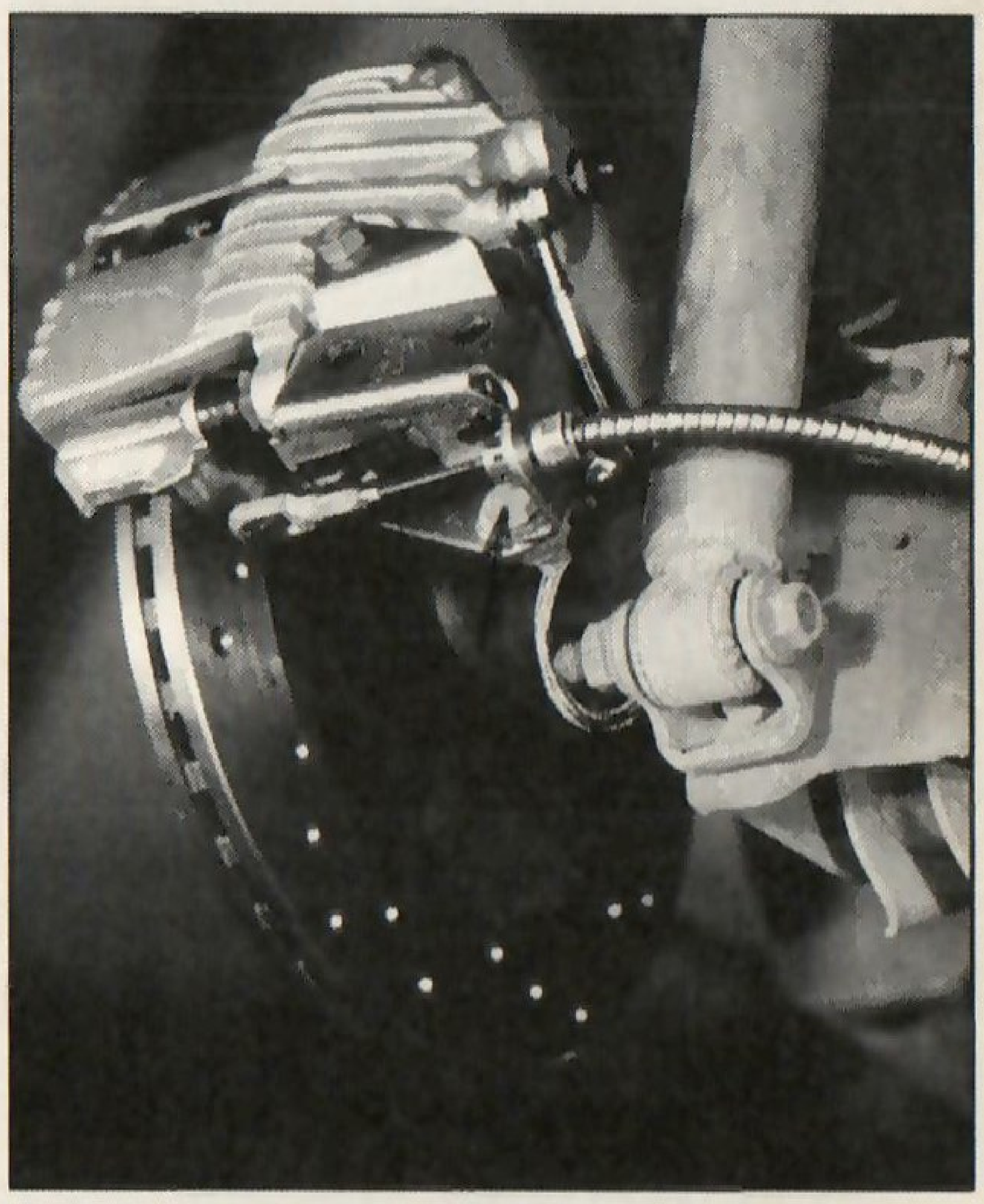
Removal of both rear axles is part of the kit's installation procedure. Baer even supplies replacement gear lubricant, to be used once the axles are re-installed and the housing cover is back in place. (Note previous suggestion about minimum use of gasket sealer for housing cover.)



Note lug nuts installed to hold brake assembly in place during final bolt-up to axle housings and backing/adapter plates supplied by Baer. It's suggested that all kit parts be initially installed using hand-wrenches, prior to applying measured torque to those elements for which specific values may be required.



Another "slick" element in the Baer kit is this proportioning valve that enables specific calibration of front-to-rear braking bias. A stock setting is recommended by Baer, from which simple re-adjustment enables "tuning" of the overall system to specific driver requirements. It's a nice touch to improving both safety and braking performance.



Emergency brake cable latches over actuating lever already positioned in rear brake assemblies supplied in the Baer kit. Some slight adjustment of cable-holding guide (as shown) may be necessary but easily accomplished via the guide's attachment bolt. Baer offers "damping" kit to stop "groan" from the tuning-fork effects sometimes generated by these guides when rotor/pad/axle flanges are not parallel (see text for explanations).

pared to the stock Mustang's system). Comparing stopping distance from 100-0mph showed the Baer kit to be superior by 28 percent (best case comparison) and a whopping 38 percent for the worst case comparison!

Stated another way, this means the car stopped (60-0mph) a 10-test average of 52 feet shorter than stock and (from 100-0mph) 136 feet and 230 feet . . . best case to worst case! And if all these numbers have yet to hit their marks of credibility, try dividing car-lengths of distance into these differences to see how much safer the car became during braking conditions after the Baer parts were installed. This is a clear case of "safety in a kit."

INSTALLATION STEPS ALONG THE WAY

In an accompanying section, you'll find a collection of notes compiled during the installation of the Baer kit. We suggest you use this list in conjunction with the highly comprehensive instructional materials supplied with the kit. In addition, photos are included that emphasize certain points in the installation that are intended to highlight the Baer materials. From these compiled instructional steps and graphics, you should be able to experience a smooth and problem-free installation experience.

SOME OVERALL OBSERVATIONS

By design, brakes are intended to convert vehicle motion (kinetic energy) into heat. The more effectively and efficiently a braking system can perform this objective, the quicker and safer a vehicle can be brought to rest. For a variety of reasons, some brake system are heat sensitive in

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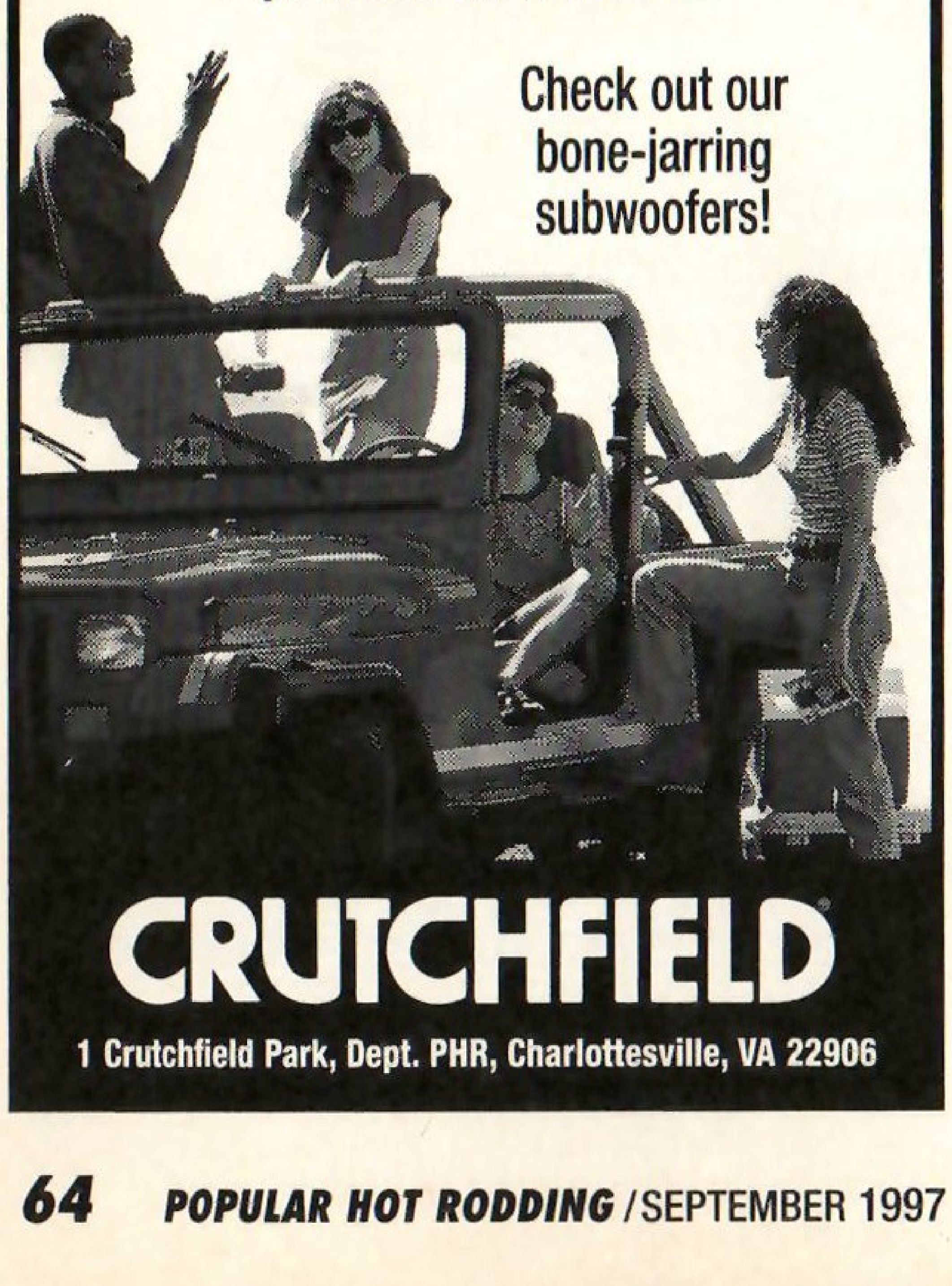
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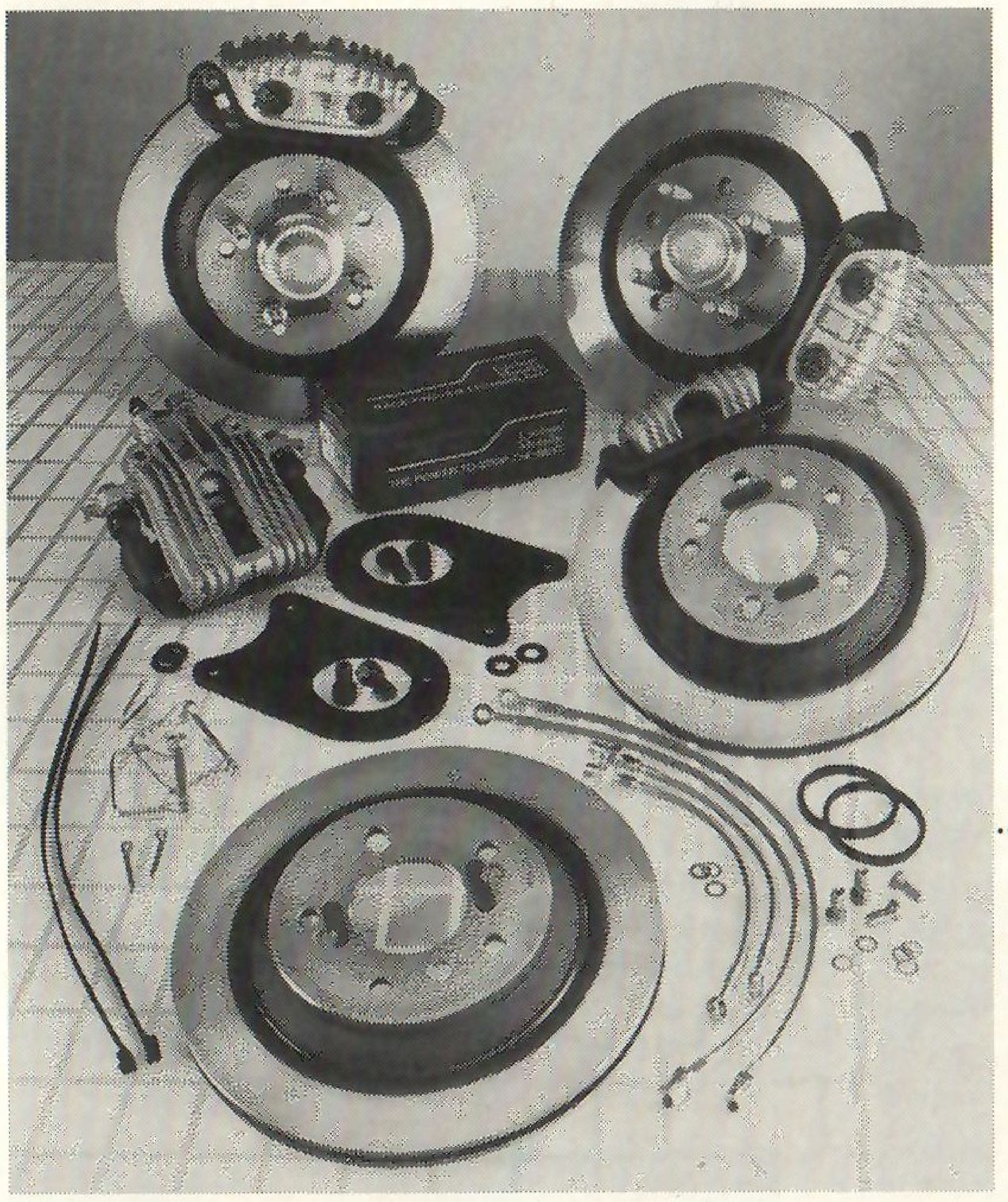


that the accumulation of elevated temperature reduces the temperature differential between energy to be dissipated (vehicle motion) and the potential for heat absorption in the brakes.

As this difference becomes less, longer stopping distances typically result . . . as witnessed by the gradually increasing distances (and time) required to repeatedly stop the subject Mustang while still equipped with its stock sys-

(Continued on page 66)

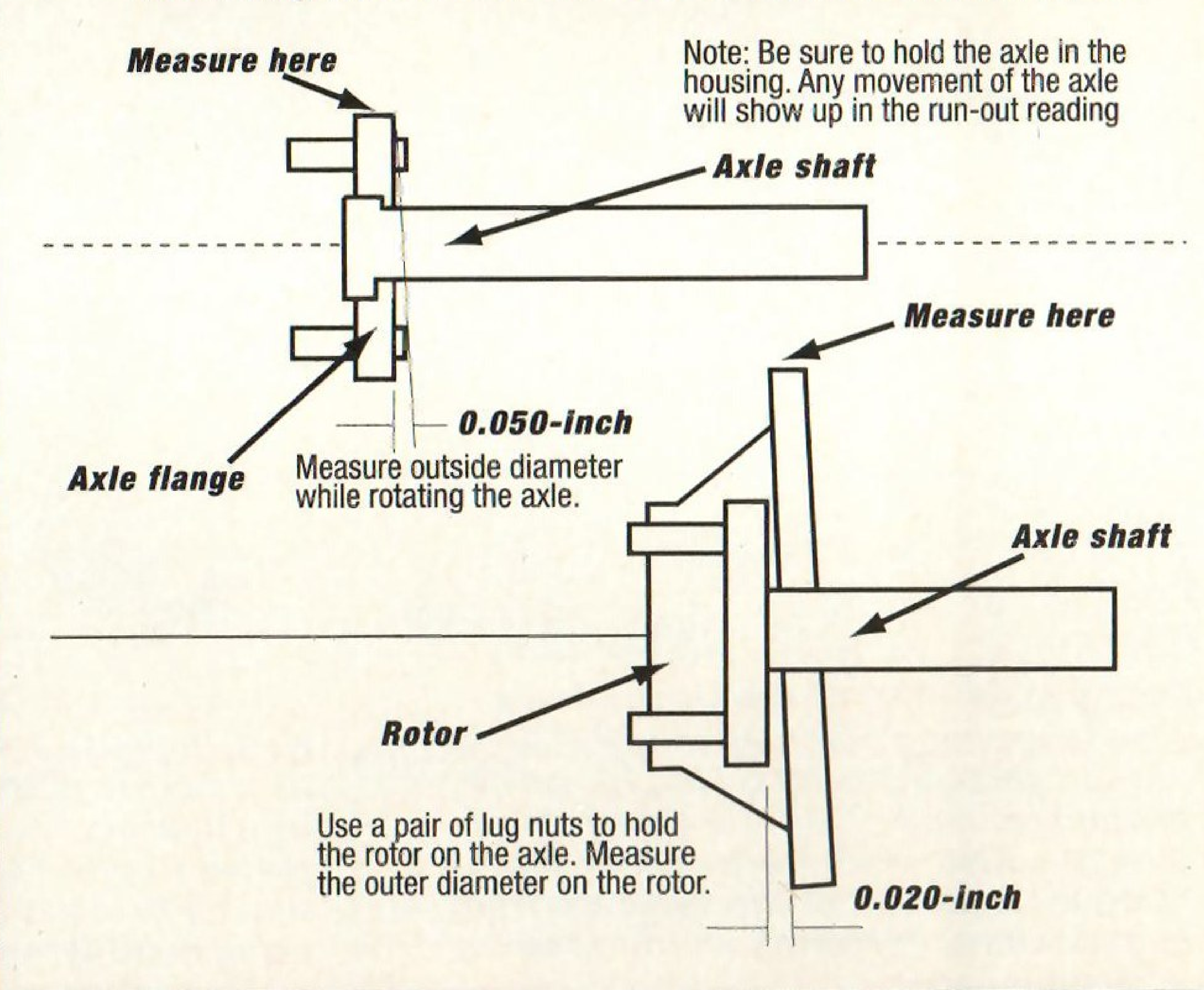
Here's the complete Baer Racing "Baer Claw" disc brake conversion kit for 1987-'92 Ford Mustangs (non-drilled version shown here). The kit comes complete with all required parts, including fresh rear gear lube and DOT-approved brake fluid.

The following instructions are provided by Baer Racing, Inc. Both of the following conditions (axle flange/ rotor run-out) cause the same problem. As the wheel turns, the rotor "wobbles" in and out.

Verification of the problem: First, measure the axle flange run-out. Remove the rotor. Use a dial indicator on the edge of the outer face of the flange. During this procedure, make sure the axle doesn't move in and out of the housing. If axle run-out is acceptable, check the rotor. Install the rotor back on the axle. Use a couple of lug nuts (as shown) to hold it in place. Again, measure the edge of the outer face with a dial indicator. Run-out of 0.020-inch is about the maximum acceptable.

Solution to the problem: If you have aftermarket axles, the manufacturer may be willing to adjust or replace axles with too much run-out. If you have stock axles, there's still hope. By installing the rotor at different positions on the lugs, you may be able to have the rotor and axle run-out cancel each other. This method is called "clocking the rotor." It's a trial-and-error method, so if you find an acceptable position, keep it. It is also possible to shim the rotor so there is little run-out. Find the low spot on the rotor with the dial indicator. Place a shim roughly one-third the thickness of the run-out dimension under the lug closest to the low spot. Under the two adjacent holes, place shims that are roughly one-half the thickness of the first shim. Re-install the rotor and check the run-out again.

Axle Flange/Rotor Run-out Measurement Determination


Measure here
Note: Be sure to hold the axle in the housing. Any movement of the axle will show up in the run-out reading
Axle shaft
Measure here
0.050-inch
Axle flange
Measure outside diameter while rotating the axle.
Axle shaft
Rotor
Use a pair of lug nuts to hold the rotor on the axle. Measure the outer diameter on the rotor.
0.020-inch

A Special Note on Handling: Skid-pad tests of the '87 Mustang test vehicle showed a best lateral force (cornering) performance of 0.76 Gs. Following the installation of the 16-inch TSW Alloy wheels and BFGoodrich Comp T/A tires (listed in the story), lateral force improved to 0.89 Gs . . . and felt like more than this!

A Special Note on Brake Noise: According to Baer's Todd Gartshore, noise (chatter or "groan") is a problem common to live-axle vehicles equipped with rear disc brakes. It can typically be heard during light braking, cornering, or slow rolling speeds. This noise appears to begin when the rotor is at some angle to the brake pad (see illustration showing this relationship). According to Todd, "Tolerances arise when the manufacturer doesn't make a part EXACTLY like the drawing. Automobiles are made of many different parts. When you add these parts together (each with its own tolerance), a condition called "stack up" is created. We, at Baer Racing, hold tolerances to +/- 0.0005-inch in order to minimize stack up problems." In such instances, Baer also provides special "damping devices" that attach to specific brake system parts to eliminate the aforementioned "groan" that does not always result from the installation of their kit . . . if factory stack up is not sufficient to cause the mal-alignment problem.

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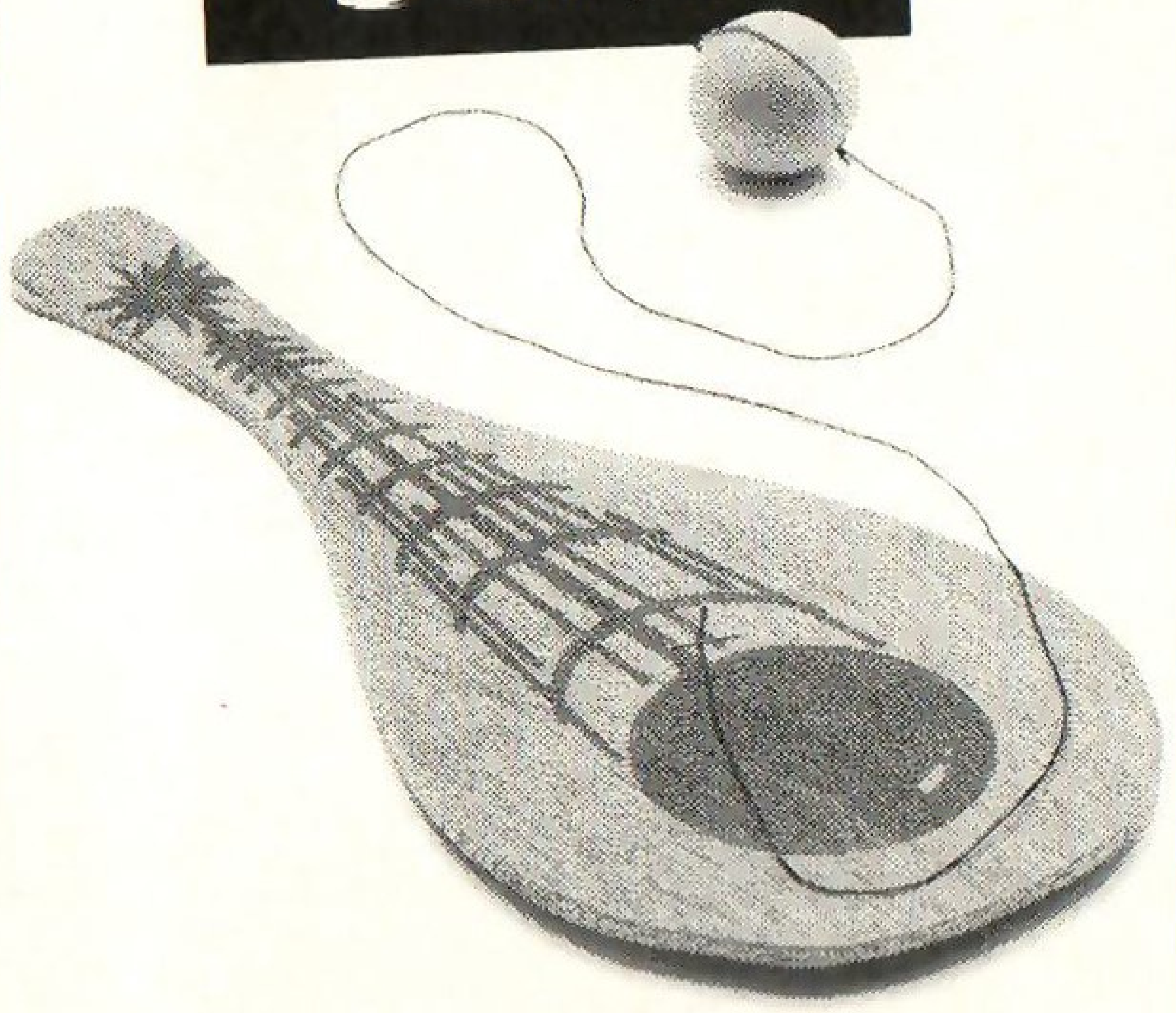

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BAER CLAWS FOR YOUR PONY *(Continued from page 64)*

tem. If you will note the data comparing stopping distances after the Baer kit was installed, it becomes clear how consistent these parts remained in the face of repeated stops and heat stack in the system. In fact (as measured), the distance between shortest and longest stopping points (60-0mph) was 31 feet for the stock brakes and only one foot for the Baer system. And if you'll examine this same type of comparison for the 100-0mph brake tests, the stock brakes had a stopping range differential of 115 feet while the Baer kit compared with only 21 feet! A safe assumption is that this kit is virtually fade resistant.

In retrospect, the Baer system reflects careful attention on the part of its manufacturer to supply a "complete" brake package; one that's supported with strategically well-planned instructions and components designed (and packaged) by people who have obviously experienced these installations on repeated occasion. Designed to be a "driveway" installation, it was interesting to note comments made by the Pro-Motion mechanics who participated in this project. Allen Bunch, a long-time friend and employee of Keith Stamper (owner of Round Rock, Texas' Pro-Motion Machine) was directed to follow the Baer instructions explicitly . . . no exceptions or modifications. Allen pretty well summed up his experience with the "kit" by commenting he'd seen many forms of so-called bolt-on parts, but "This one is by far the most complete and comprehensive one I've ever seen." And besides all that, this is one little Mustang that can now claw the ground like a . . . well, like a Baer. ▨

COMPARATIVE BRAKING PERFORMANCE

Tests based on stopping distance measured (in feet) from 60-0mph

STOCK BRAKE SYSTEM

	Distance (feet)	Deceleration (G's)	Time to stop (seconds)
Test #1	156 (162)	0.791	4.5
Test #5	168 (174)	0.787	4.5
Test #10	187 (203)	0.701	4.7
Average	170 (180)	0.760	4.6

BAER BRAKE SYSTEM

	Distance (feet)	Deceleration (G's)	Time to stop (seconds)
Test #1	118 (121)	0.975	3.2
Test #5	118 (122)	0.984	3.2
Test #10	117 (122)	0.980	3.2
Average	118 (122)	0.979	3.2

STOCK BRAKE SYSTEM

	Distance (feet)	Deceleration (G's)	Time to stop (seconds)
Best Performance	488 (493)	0.788	5.9
Worst Performance	603 (614)	0.680	6.4

BAER BRAKE SYSTEM

	Distance (feet)	Deceleration (G's)	Time to stop (seconds)
Best Performance	352 (355)	0.910	4.6
Worst Performance	373 (377)	0.888	5.1

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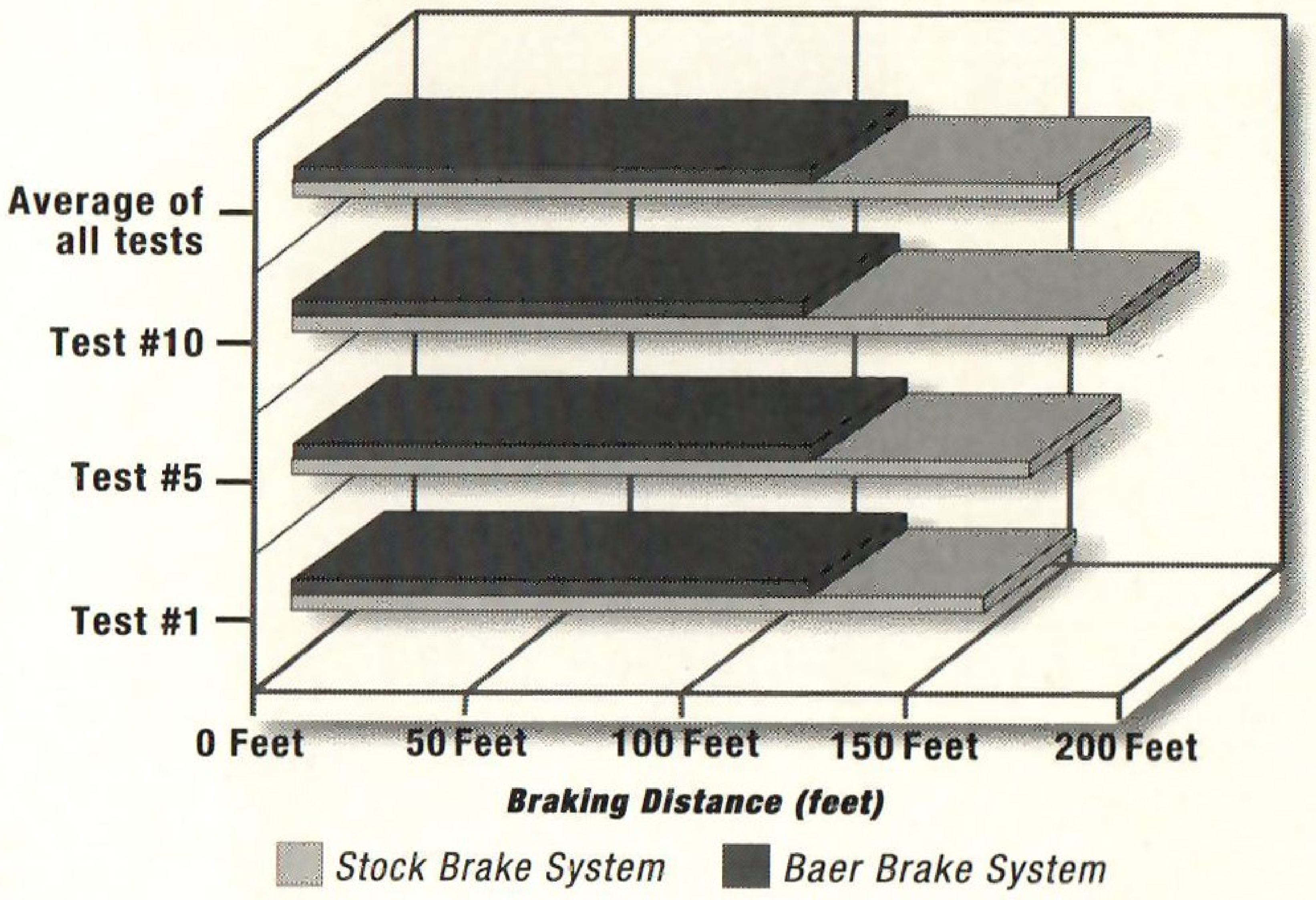
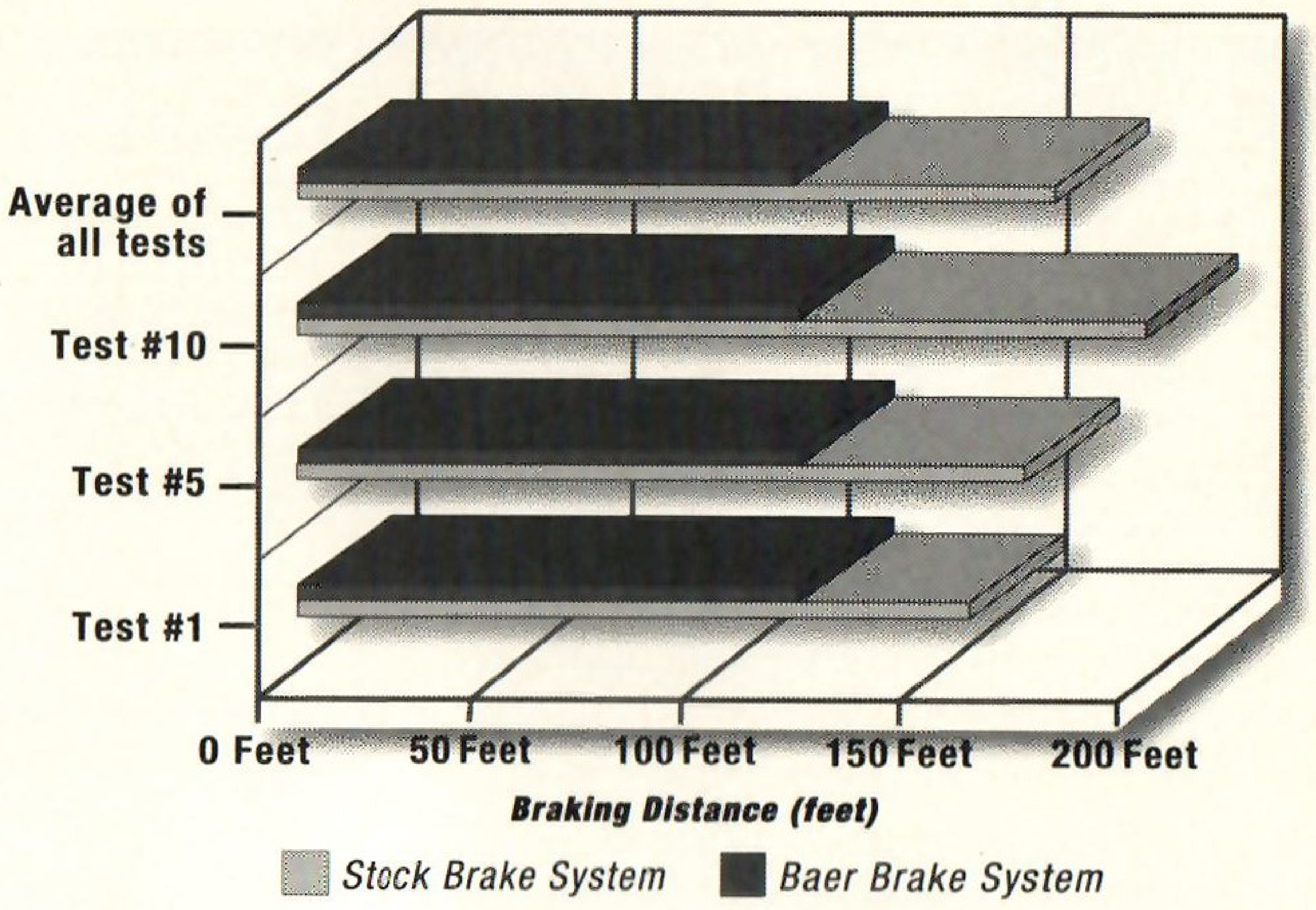


Comparative Braking Performance (Data produced by Baer Racing)

This set of data shows a summary of 10 successive braking tests (indicated by tests #1, 5, 10 and an average of all 10 tests performed). Of the data presented, two sets are of particular interest — First, note how successive braking with the stock system shows progressively longer distances for stopping from test # 1 to # 10. By comparison, the Baer system did not exhibit this condition of "fade" after the same number of repeated brake tests. Next, compare actual stopping distances (indicated from 60-0mph) for the same number of successive tests. (Story details specific percentages of stopping distance improvement.) In the instance of these data, Baer Racing's rigorous testing was used to establish the results shown.



Comparative Braking Performance (Data produced by author for PHR)

Close examination of these data will show a direct correlation between the author's braking performance results and those from Baer Racing. While the Baer data was derived using a 1990 5.OL Mustang, the author's test vehicle was an '87 5.OL Mustang G T . . . deriving results that were not related to any significant differences between test vehicles. As in the data produced by Baer, heat stack in the stock system, the kit's ability to withstand this problem, and the reduced stopping distances were all consistent with the Baer test information. Credibility all 'round.

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BAER CLAWS FOR YOUR PONY

(Continued from page 67)

ADDITIONAL INSTALLATION TIPS

1. Remove all brake fluid from system before starting installation of kit. This will remove any possible fluid contamination that may "infect" the new fluid. For dual-chamber master cylinders, make certain to drain both front and rear chambers.
2. Check lower ball joints and tie-rod ends for wear when these units are disassembled during installation of the brake kit. Replace any excessively worn parts.
3. Hang your new wheels on the spindles to check for all around clearance prior to final assembly of kit parts.
4. Have front-end alignment checked following installation of the Baer system.
5. Make certain you follow Baer instructions on the modification and re-orientation of front and rear brake line bracket.
6. Use a heavy-duty tie-wrap to locate front brake line inside strut.
7. To ensure good fit and seal, tighten, loosen and re-tighten all brake line fittings during installation of the kit.
8. Use the Baer supplied DOT #3 brake fluid (or whatever is recommended in their instruction manual).
9. Don't over-tighten the brake line bracket "bolt" (hex-head sheet metal screw).
10. Use caution not to crimp brake lines by mis-aligning any of the Baer-supplied brackets.
11. When re-installing rear gear housing cover, use only a light coating of gasket sealer.
12. IMPORTANT! Read the Baer instruction manual at least twice before beginning kit installation. This material is one of the most comprehensively prepared sets of instructions we have encountered in the high performance parts industry! Follow it to the letter.

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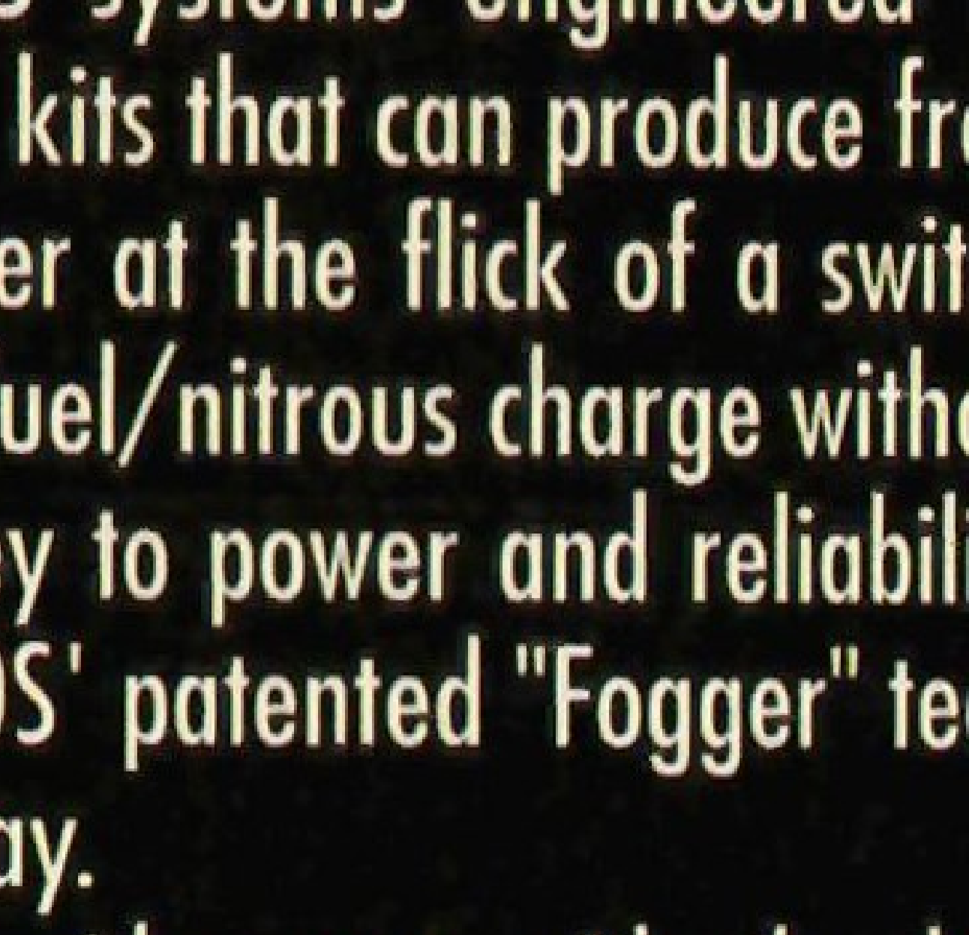

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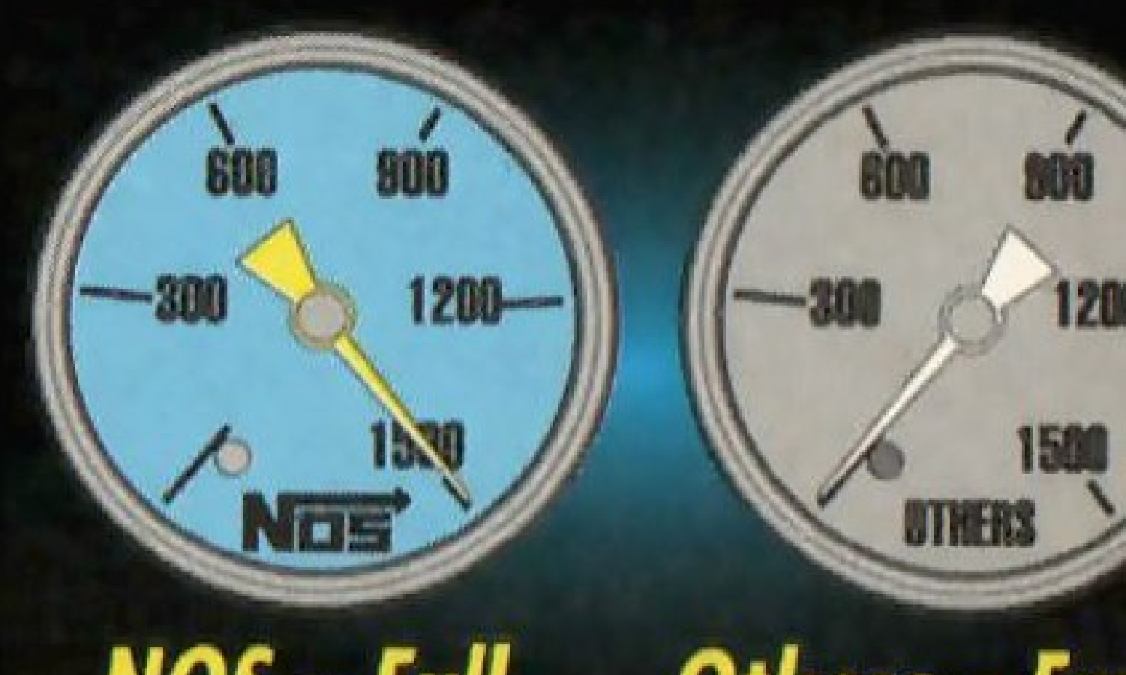

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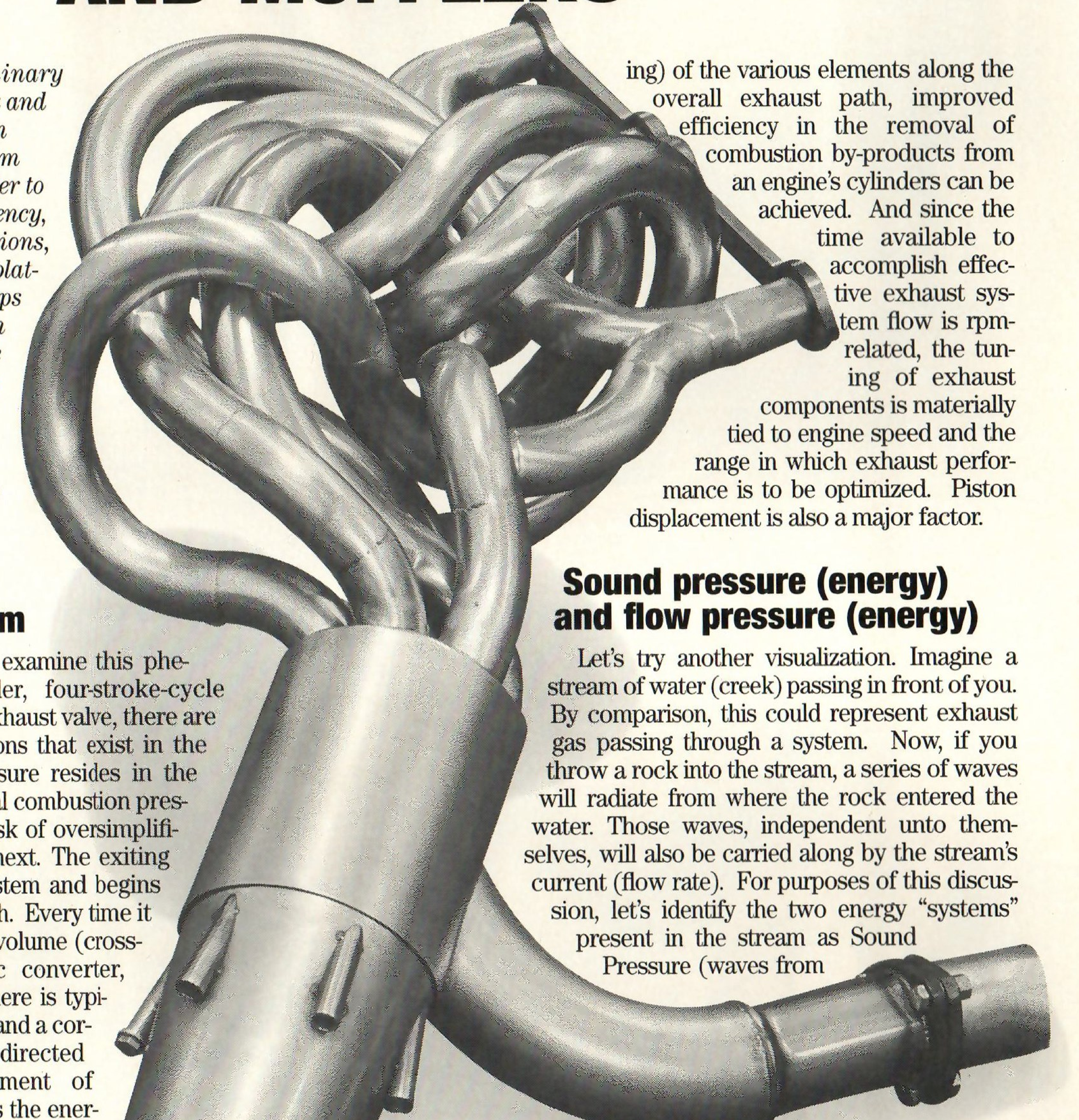
THE PERFORMANCE INFORMANT

INTRO BY JIM McFARLAND

HEADERS, EXHAUST SYSTEMS, AND MUFFLERS

Here are some preliminary thoughts. Let's step back and take a view of how an engine's exhaust system needs to perform in order to maximize combustion efficiency, power, fuel economy, emissions, and driveability. From this platform of understanding, perhaps how the requirements of an effective exhaust system are met will become more easily identified and used for products and systems selection at the consumer level. So with that in mind, here are some items to consider.



Pressure movement in the exhaust system

For example, suppose we examine this phenomenon in a single-cylinder, four-stroke-cycle engine. Upon opening of the exhaust valve, there are two primary pressure conditions that exist in the system: (1) atmospheric pressure resides in the exhaust system and (2) residual combustion pressure in the cylinder. At the risk of oversimplification, here's what happens next. The exiting exhaust "pulse" enters the system and begins traveling along the exhaust path. Every time it experiences a change in path volume (crossover pipe, muffler, catalytic converter, stepped-header pipes, etc.), there is typically a change in flow velocity and a corresponding refracted wave directed against the primary movement of exhaust flow. As an aside, it is the energy "system" generated by these refracted sound/pressure waves that can be utilized to help improve the "scavenge" efficiency of a given exhaust system. That issue will surface again in a few paragraphs.

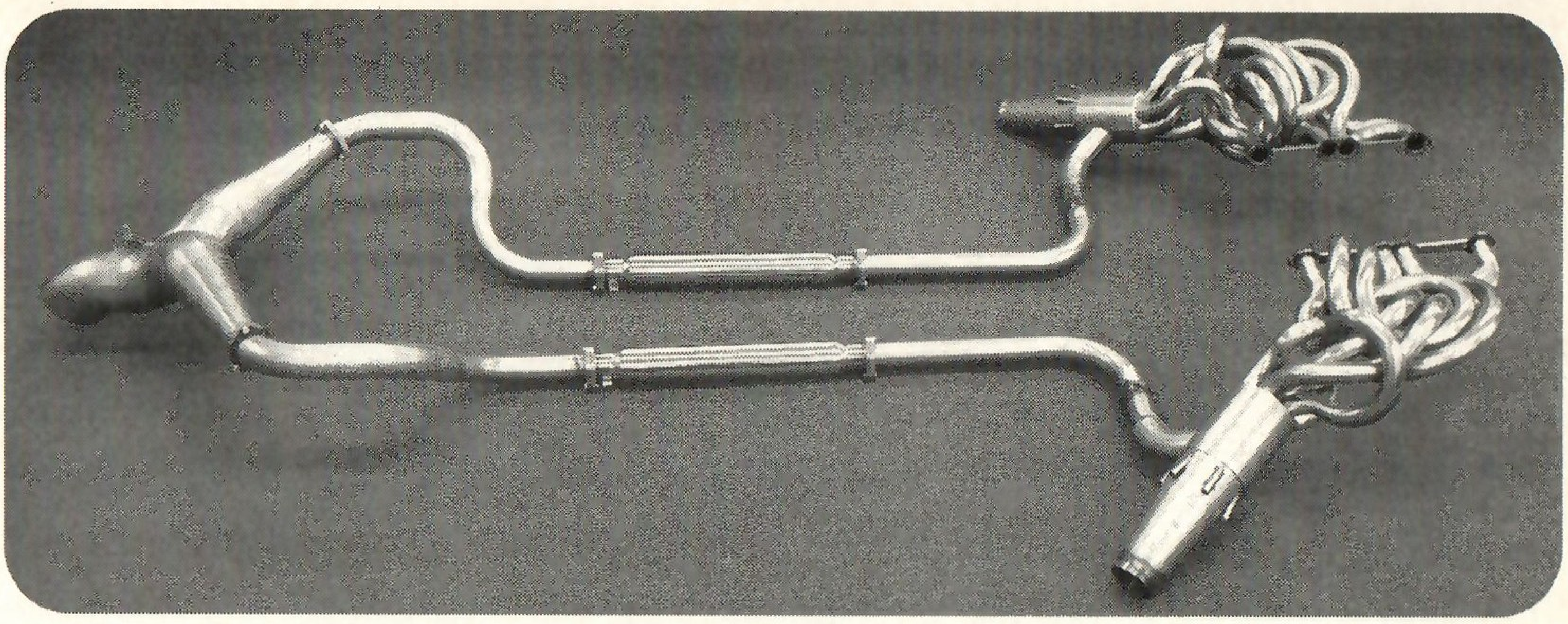
Once this exhaust pulse completes its travel along the exiting path, it encounters atmospheric pressure at the system's end point. Here again, an energy reaction (refraction) takes place as the exiting pulse "sees" the outside world. By the proper dimensioning (tuning) of the various elements along the overall exhaust path, improved efficiency in the removal of combustion by-products from an engine's cylinders can be achieved. And since the time available to accomplish effective exhaust system flow is rpm-related, the tuning of exhaust components is materially tied to engine speed and the range in which exhaust performance is to be optimized. Piston displacement is also a major factor.

Sound pressure (energy) and flow pressure (energy)

Let's try another visualization. Imagine a stream of water (creek) passing in front of you. By comparison, this could represent exhaust gas passing through a system. Now, if you throw a rock into the stream, a series of waves will radiate from where the rock entered the water. Those waves, independent unto themselves, will also be carried along by the stream's current (flow rate). For purposes of this discussion, let's identify the two energy "systems" present in the stream as Sound Pressure (waves from the entering rock) and Flow Pressure (movement or force of the stream). While these two energy systems are functionally intertwined in an operational exhaust system, it is possible to treat them separately in the design for selection of exhaust components.

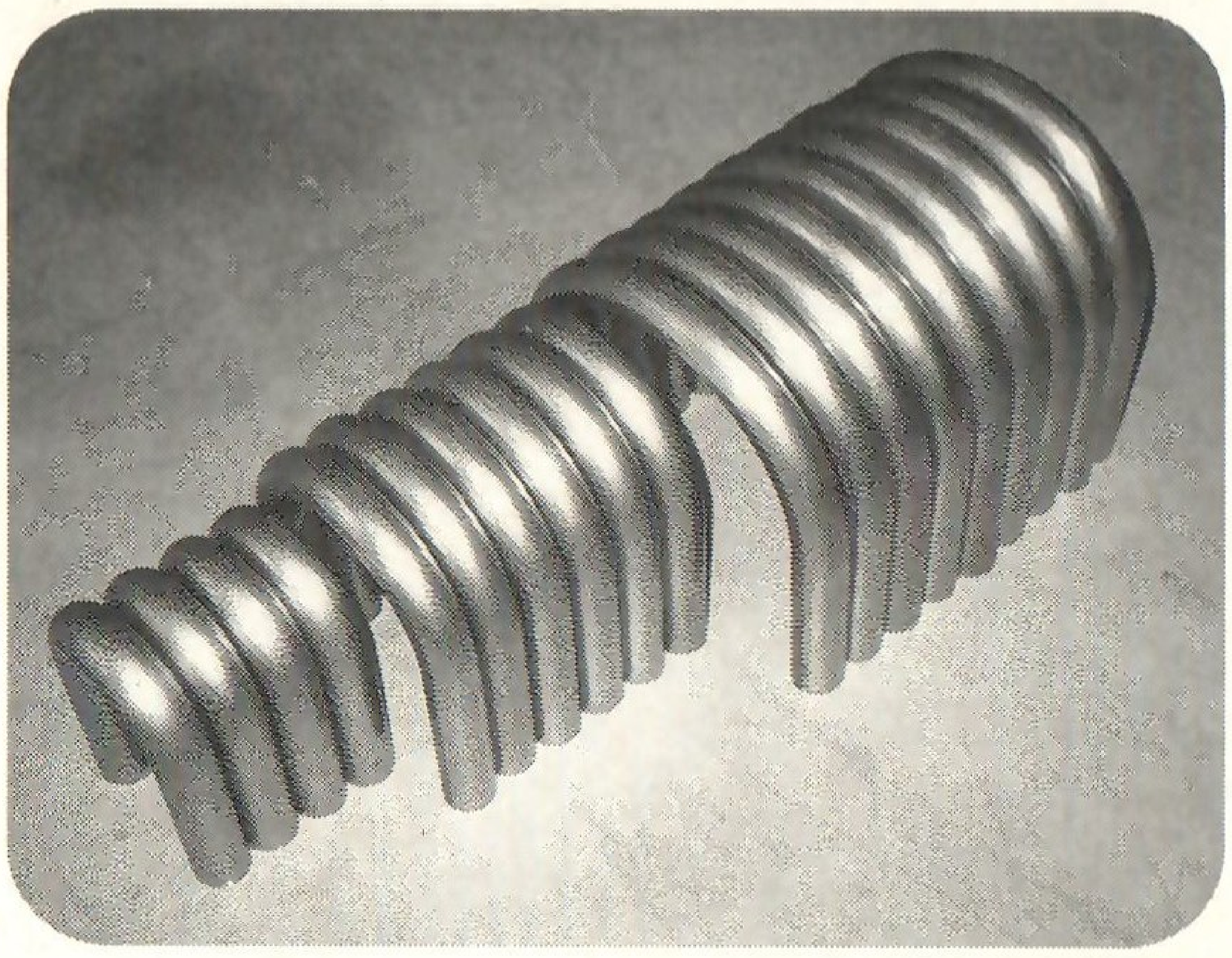
Fundamentals of exhaust "tuning"

Here's another visualization. This time, picture a simple coil spring attached to the ceiling. Connected to this spring is a small weight. If you pull down on the weight and then release it, the spring/weight "system" will oscillate in simple harmonic motion. Given sufficient time, this system will eventually come to rest



again. This is a so-called "single-degree of freedom" system.

If we now attached a second spring (of different characteristics) to the first system's weight and added a different weight to this spring, pulled down on this weight and released both systems, the harmonic motions then described would not initially be at the same period or frequency for the two sets of springs and weights. At this point, we'd have a "two-degree of freedom" system whose oscillations would (at some point in time) be at the same period and frequency . . . resulting in an additive system whose efficiency (combined forces) would be momentarily increased over the capability of either of the systems by themselves. You may want to read this paragraph again, because (in simplified terms) it is analogous to how a tuned exhaust system works (or is designed) as a multiple-degree of freedom system.



Exhaust headers

Generally, there are two types: Collected and Non-collected. Collected systems gather individual cylinder pipes into some form of common passage (collector), and non-collected versions allow pipes to exit independent of other cylinders. So-called "zoomie" header pipes are common examples of non-collected systems . . . as typically seen on Top Fuel Dragsters and Funny Cars.

In the "collected" category, differences rely upon the method of primary pipe arrangement into their respective collectors. If all primary pipes are gathered into a single collector, an "X-into-one" system results. For example, in a V-8 engine's configuration, this would be a four-into-one system for each side of the engine.

Using this same type engine, if the primary pipes are connected (in pairs) to collectors that are then joined into a single collector, a "Tri-Y" system is created. Rules of thumb are risky here, but you could generally state (depending upon pipe sizing and collection points) that Tri-Y headers improve low rpm torque when compared to the joining of all primary pipes into a single collector (as in the four-into-one design for V-8 engines).

If primary pipes are connected to collectors so that each collector receives an exhaust pulse every 180-degrees of crankshaft rotation, the so-called 180-degree header design is produced. As a function of related camshaft design, these type headers can be used to widen the rpm span over which torque benefits are created.

One rule of thumb that does apply with headers is the sizing of primary pipes and collectors. Here it is: Primary pipe diameter relates to the peak torque rpm point, and pipe length determines the amount of torque produced either above or below this peak torque point. For example, small primary tubes move peak torque downward in rpm (larger upward). Long tubes increase torque below peak torque rpm (removing it from above peak torque), while short tubes increase torque above peak torque rpm (removing it from below peak torque).

For collectors, here's the rule: Collectors contribute torque primarily below peak torque rpm. (You don't see much collector on a Pro Stock engine because operational rpm is never below peak torque. Bracket cars with two-speed transmissions use considerable collector (volume) because these engines spend a fair amount of time below peak torque rpm.

Stepped headers?

How these work depends somewhat upon whom you ask. But, consider this possibility. Remember the multiple-degree of freedom system concept mentioned earlier? Each time an exiting exhaust pulse sees a change in pipe volume (stepped or otherwise), a change in velocity occurs and refracted pulses are generated (a single-degree of freedom system is created). By the proper placement of steps (rpm and piston displacement related), does it make sense that a multiple-degree of freedom system can be designed that maximizes exhaust flow at more than one rpm point? In fact, both computer simulation and accurate engine dyno testing have shown the generation of multiple torque "peaks" can be created (at different rpm points) by the correct sizing of primary pipe and placement of steps. In this case, there's just no magic involved.

Types of mufflers

Let's boil these down to the two most common types (although slight iterations exist for both): Packed and non-packed.

Packed mufflers

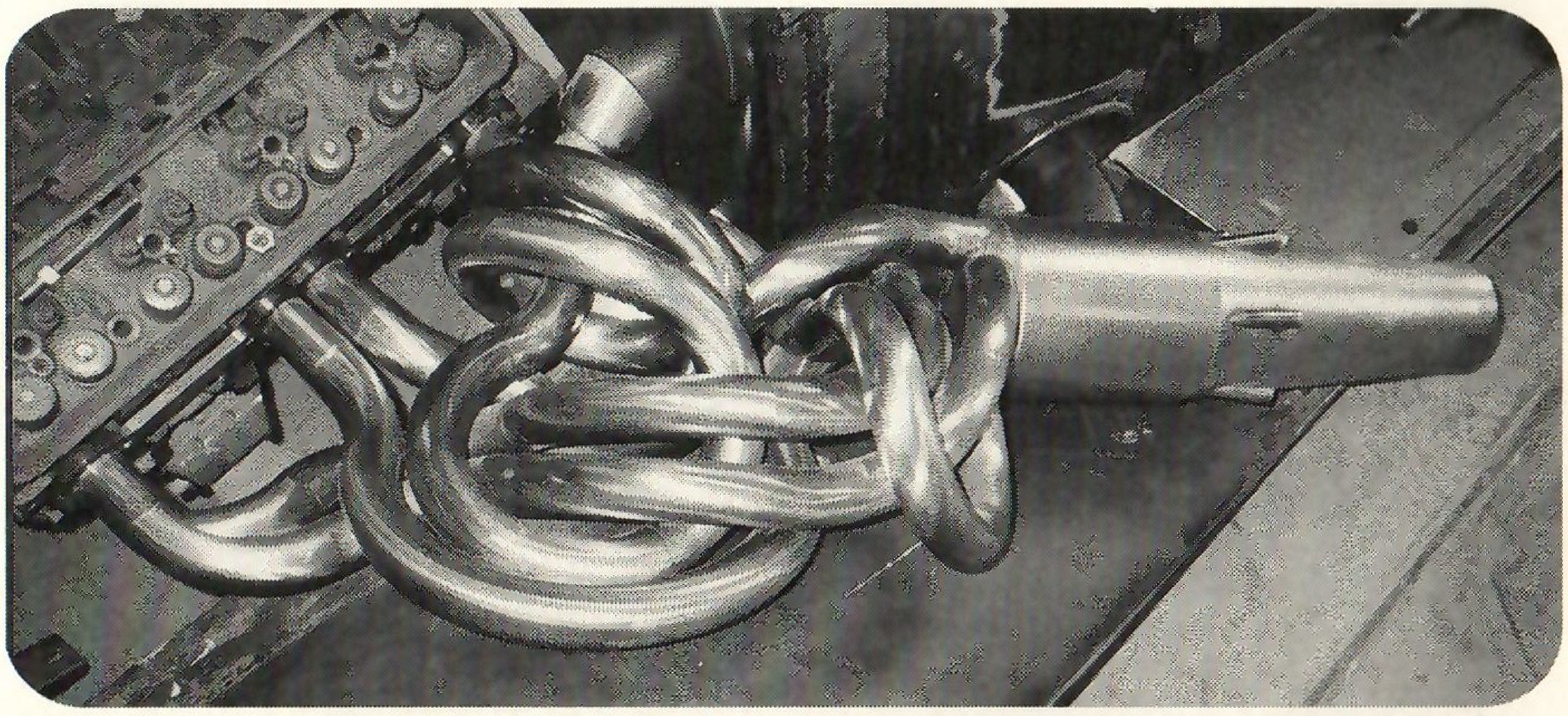
Historically, the reason for stuffing mufflers with some type of packing materials (stainless steel wool, fiberglass, shredded composites, etc.) is to absorb sound energy. In many instances, packed mufflers utilize direct or near-direct flow paths from inlet to outlet. This minimizes backpressure and relies upon the ability of louver arrangement and packing to dampen sound levels. As a rule, there is not much attention given to utilization of sound pressure/energy modification or control techniques. By the definition applied in this story, we are referencing sound frequency cancellation or other acoustic damping methods that break down sound energy levels to either reduce or modify noise production.

Non-packed mufflers

Through the use of baffles, chambers, or related directional changes in exhaust flow paths, these mufflers employ various sound pressure and flow pressure modification techniques. Helmholtz resonators ("captured" volumes accessible by calibrated tubing entries) can be tuned to impact both tone and sound levels produced. Reflecting baffles (or "directors") are also used to affect both sound and flow energies. Often, in these types of mufflers (particularly of the OEM variety), backpressure accumulated within a given muffler can be used to attenuate sound, although this technique often becomes a source of flow losses, contaminated combustion and lost performance.

Slowly becoming evident among some OEM and aftermarket types of mufflers are those termed to be "active" or capable of providing variable flow/sound capacity as a function of engine rpm for flow pressure energy). For example, some claims assert certain mufflers are designed to produce one flow path at low rpm and another (higher capacity) as engine speed increases. Self-adjusting, spring-loaded, or pressure actuated devices internal to a muffler are also among the current means that provide "active" muffler functions. Experimentally, the use of electronic controls to accomplish active muffler status have verified laboratory performance but do not appear cost-effective for today's over-the-highway vehicles. Electronically-derived sound cancellation frequency generation is another approach already in use by heavy equipment and high noise output machinery operators . . . but not yet in commercially available mufflers.

There's also recent evidence that some mufflers are being designed to be "tuneable" by the changing of internal parts from external locations. Reportedly, these designs are intended to affect torque (where it's produced and by what amount), tone, and sound level. Accordingly, the benefits of these mufflers include the degree of flexibility and convenience they provide by these "externally adjustable" features.



Exhaust systems

A variety of other components can be used to affect (or do affect) an engine's overall exhaust system. Perhaps primary among these are catalytic converters. Because some element of time is required to maintain exhaust gas exposure to converter reactive materials, these parts can become impediments to exhaust flow efficiency . . . at some rpm and piston displacement, both of which are factors in converter flow capacity.

In fact, unless some form of "high performance" converter is used when modifying an exhaust system for higher rpm operation, consideration should be given to the point at which stock converters become a restriction to net flow. Otherwise, equipping an engine with an elevated-rpm system can produce less than optimum results and, in some cases, lower performance than with the stock parts. So check with the manufacturer of the pieces you contemplate installing, just to make sure they provide performance benefits below the rpm at which the stock converter(s) limit overall exhaust flow. You may discover there are exhaust component manufacturers who are currently building parts designed specifically to work at rpm below converter-caused flow restrictions. They're out there, if you check.

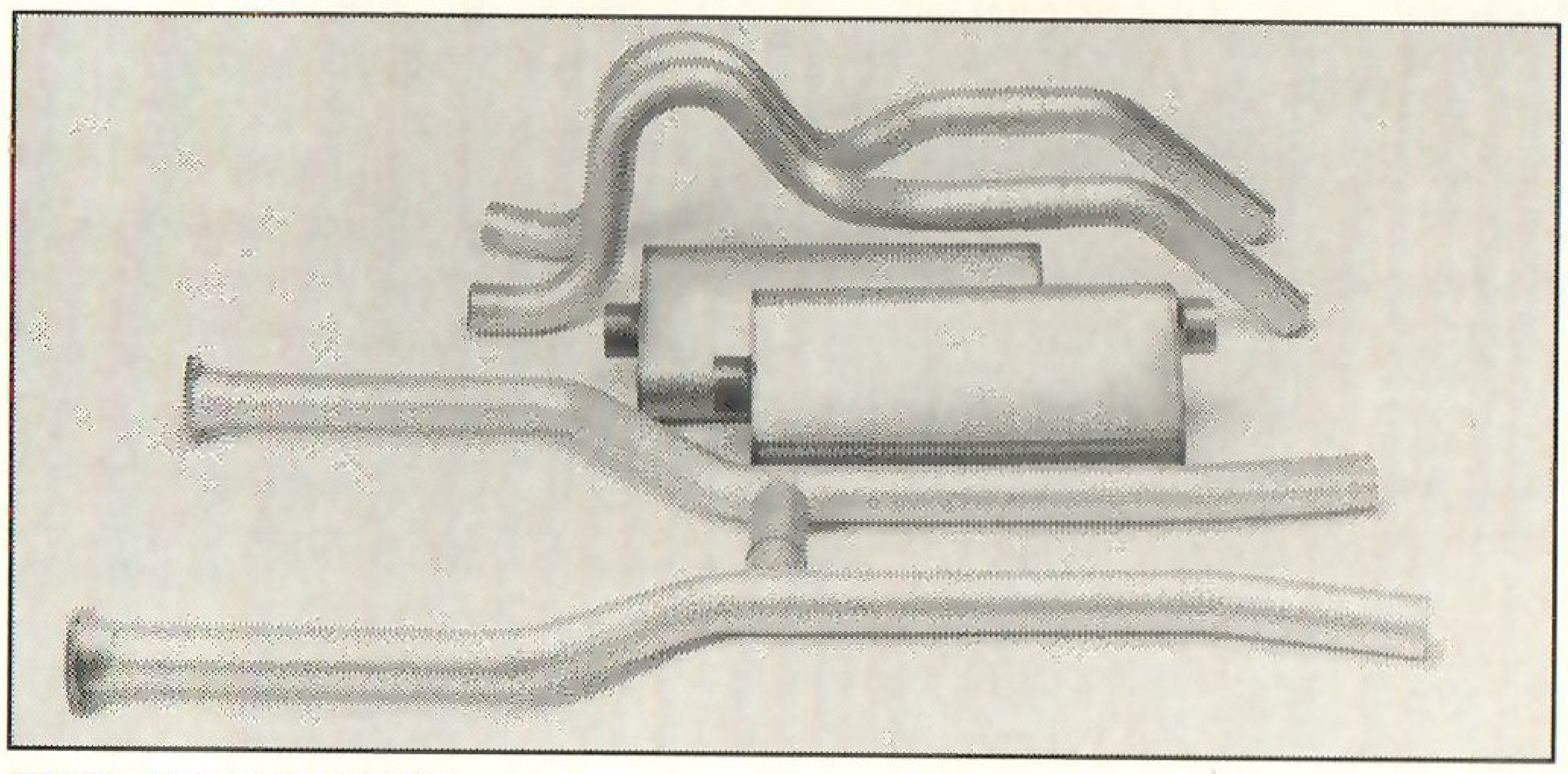
Crossover pipes have become a common approach to improving low- and mid-rpm torque output. Interestingly, there are various types of these "pipes" currently being marketed. Some are "chambers," while others are a form of "X-pipe." Some are even being installed in straight pipe pairs, but generally all are intended to increase the volume of pipe (a "plenum" effect, if you will) ahead of either converters, mufflers, or both. According to published information, some of the designs are reported to reduce post-engine and pre-muffler backpressure conditions, increasing power via less combustion contamination.

Some OEM and a few aftermarket exhaust parts manufacturers are now producing exhaust pipe tips that double as silencers. Usually, these parts incorporate perforated tubes within tubes (like "mini-mufflers) that not only remove some of the "rap" during engine deceleration but also have an effect upon tone and exhaust note amplitude.

A few wrap-up thoughts

As is so often the case when engine parts and systems are examined, compromise is an issue. To minimize compromise and get the most results from an exhaust system/components investment, try the following little checklist: What do you want from the purchase? Try to determine if power, fuel economy, sound/tone, durability, or other considerations are primary among the objectives. Be realistic about the rpm range in which the engine will be operated. Consider the effects of catalytic converters and their inherent limitations. And remember, bigger isn't always better when it comes to parts choices. Choose pieces for torque, unless your vehicle is going to see some serious high performance applications. In the final analysis, it's not an occasional blast of power that justifies the expenditure for vehicle modifications. More often than not, it's the driveability and performance benefits on a day-to-day basis that provide the payback. ▨

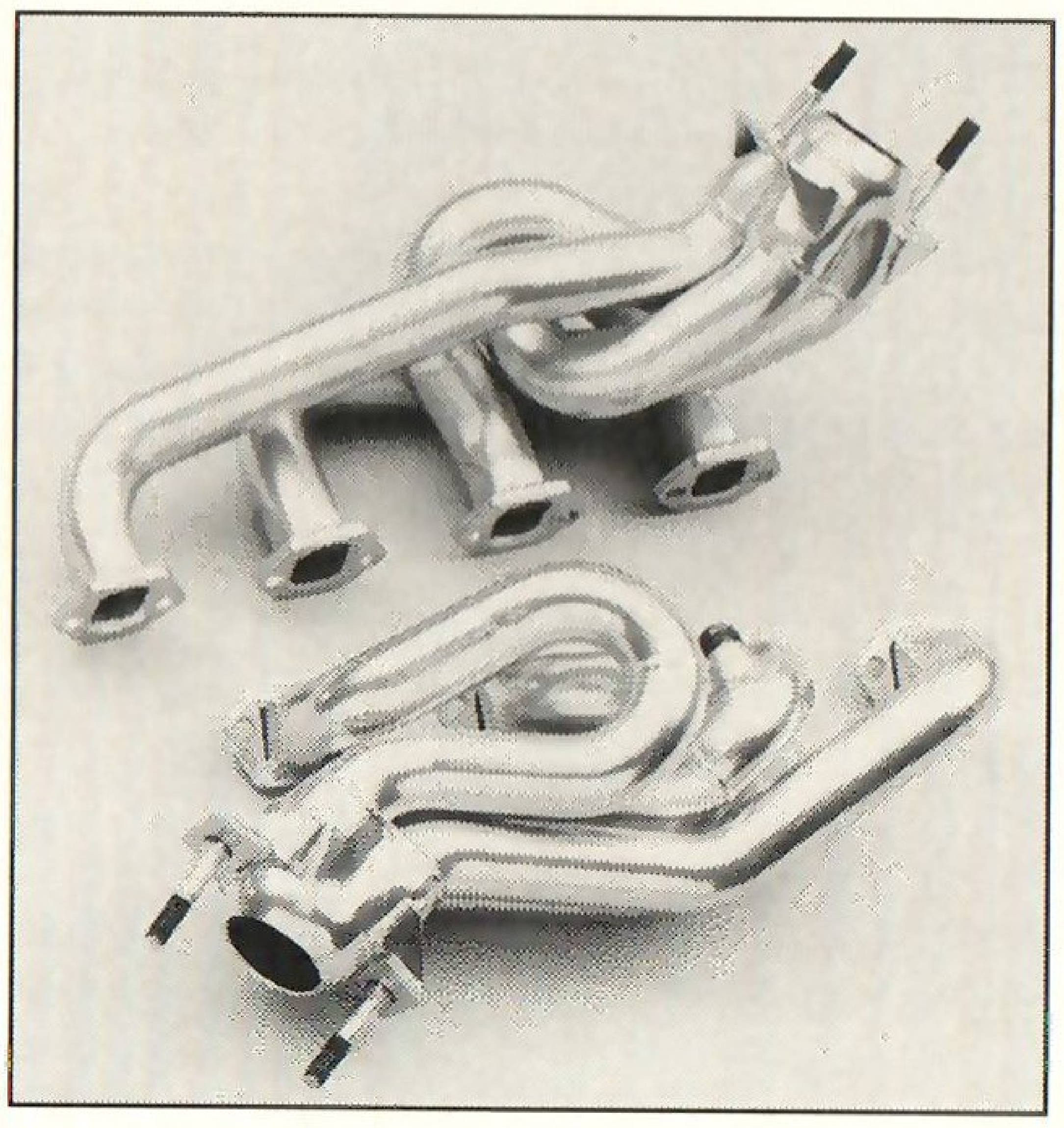
BUYER'S GUIDE



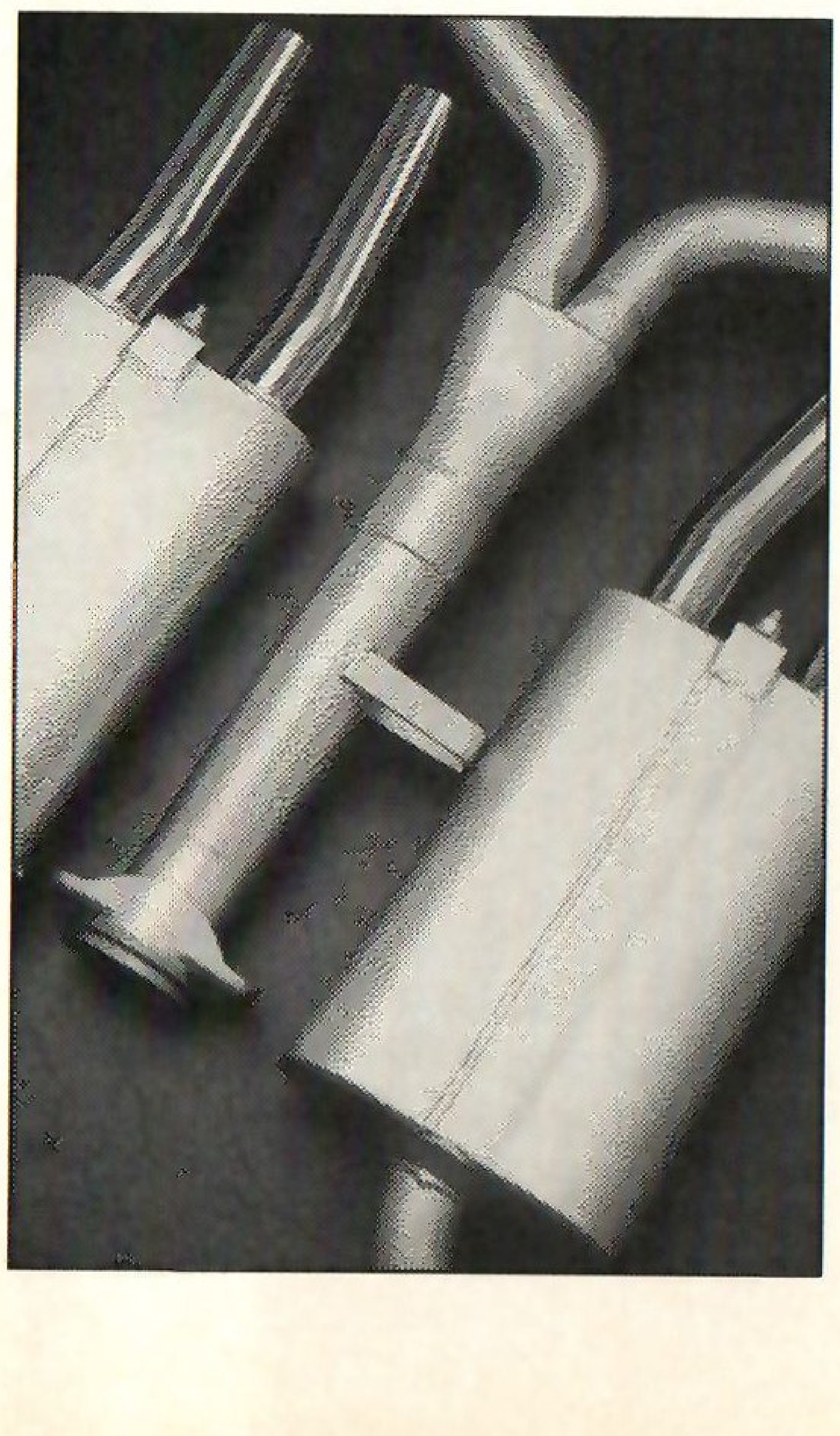
EDELBROCK

Edelbrock's Total Power Package concept has been extended all the way out to the rear bumper with the introduction of their Header-Back exhaust systems. The systems feature the RPM Series Heavy Duty/Race mufflers, while an adjustable H-pipe is also provided for additional sound attenuation and added torque. The systems are manufactured from 2.5-inch mandrel bent tubing and are available for 1967-74 Camaros/Firebirds and 1964-74 GM A-Body vehicles. **Edelbrock Corporation**, 2700 California St., Dept. PHR, Torrance, CA 90503, (310) 781-2222.

SALEEN PERFORMANCE PARTS

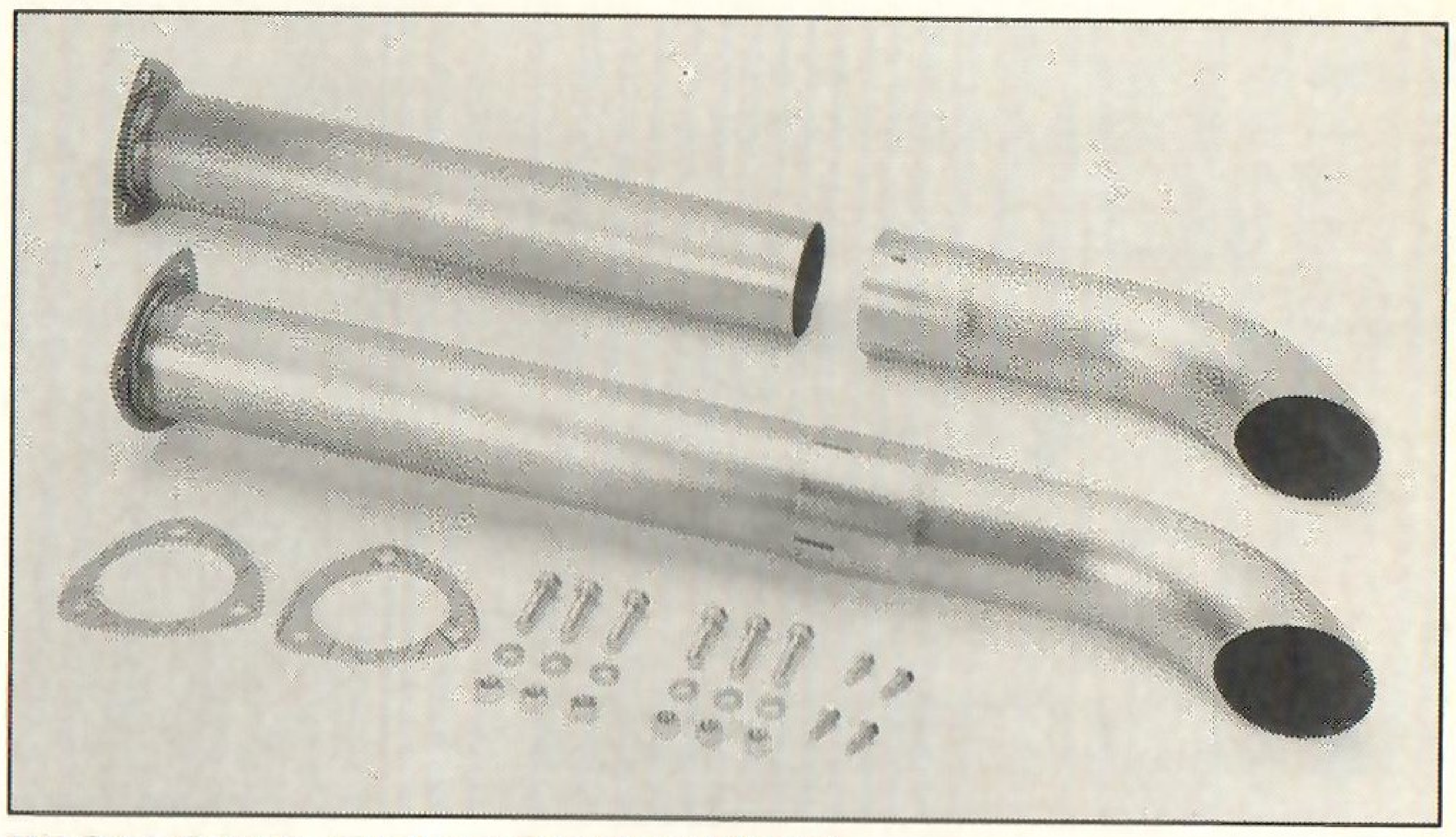


Owners of 1987-95 5.0L Mustangs can free up some valuable horsepower with a set of Saleen Performance Parts Equal Length Headers. Available in ceramic or sperex coatings, the Equal Length Headers utilize 1.625-inch primary tube diameters, require no modifications for installation, and offer measurable horsepower gains over the nearest competitor. Saleen's ceramic-coated versions also offer a five-year corrosion warranty. For more information contact **Saleen Performance Parts**, 9 Whatney Dr., Dept. PHR, Irvine, CA 92718, (800) 888-8945.



FLOWMASTER

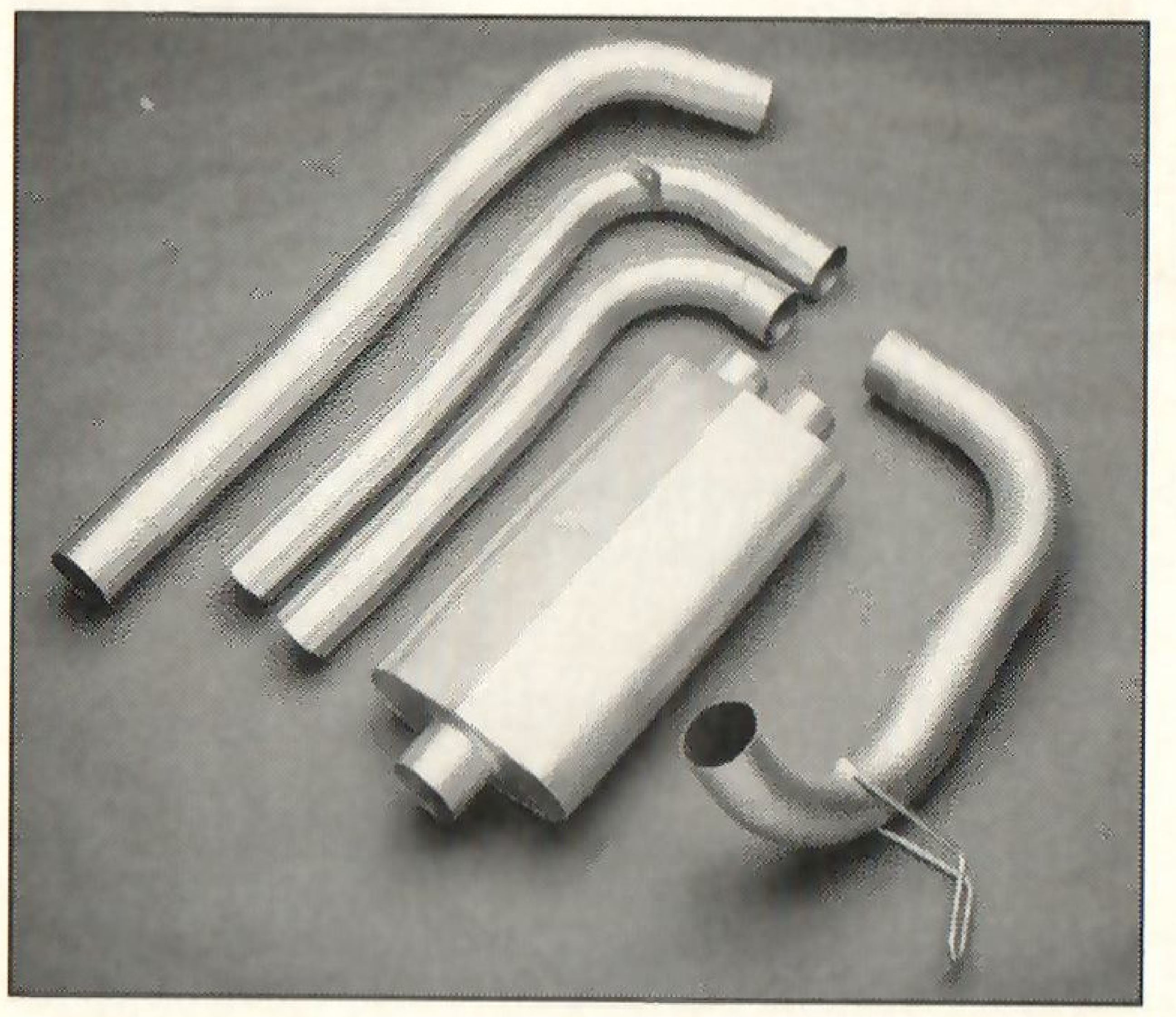
Boosting the horsepower and torque of 1986-90 Corvettes is as easy as installing Flowmaster's Force II Cat-Back exhaust system. An aluminized 3-inch Y-pipe splits into dual 2.25-inch 50 Series mufflers and stainless steel exhaust tips for a mild performance tone. Force II systems are mandrel bent for reduced backpressure and feature a patented D-port design for maximum exhaust flow. Factory-style hangers can be used, making installation a snap. Contact: **Flowmaster, Inc.**, 2975 Dutton Ave., Dept. PHR, Santa Rosa, CA 95407, (800) 544-4761.



MOROSO PERFORMANCE

Moroso Performance Products now offers Exhaust Header Turndowns ranging in size from 3-inch to 4-inch collector diameters to meet sound requirements imposed at certain tracks. The mandrel bent turndowns direct the expelled gasses to the ground without restricting the exhaust flow, and are manufactured from 16-gauge steel for durability. Pipe lengths can be cut to size to achieve maximum power output. For more information contact **Moroso Performance Products**, 80 Carter Dr., P.O. Box 1470, Dept. PHR, Guilford, CT 06437, (203) 453-6571.

SLP ENGINEERING



Owners of 1982-97 Firebirds and Camaros will be pleased to hear about the new converter-back, stainless steel exhaust systems from SLP. Why? They can provide up to 15 additional horsepower (depending on application), so claims the manufacturer. Made from mandrel bent 409SS tubing, the system includes: 3-inch diameter intermediate pipe, all-stainless muffler (3-inch inlet), with two outlets using 2-1/2-inch mandrel bent tailpipes. Systems for 1993-97 models also come with 304SS tailpipes with round slash-cut ends and 1982-92 models feature round slash-cut 409SS ends. SLP Engineering, Inc., 1501 Industrial Way North, Dept. PHR, Toms River, NJ 08755, (908) 349-2109.

SUMMIT RACING

Summit Racing's *turbo muffler* is an aluminized, free flowing muffler that combines cost effective pricing with plenty of power. The Summit Turbo is designed with a double wrapped case with lock seams; spot welded inner baffles, and locked and spot welded inner necks. Sizes are available ranging from 2.25-inch up to 3-inch diameters. Extensive dyno testing has shown gains of 21 horsepower over the leading competitor's turbo muffler. **Summit Racing Equipment**, P.O. Box 909, Dept. PHR, Akron, OH 44309, (330) 630-5343.

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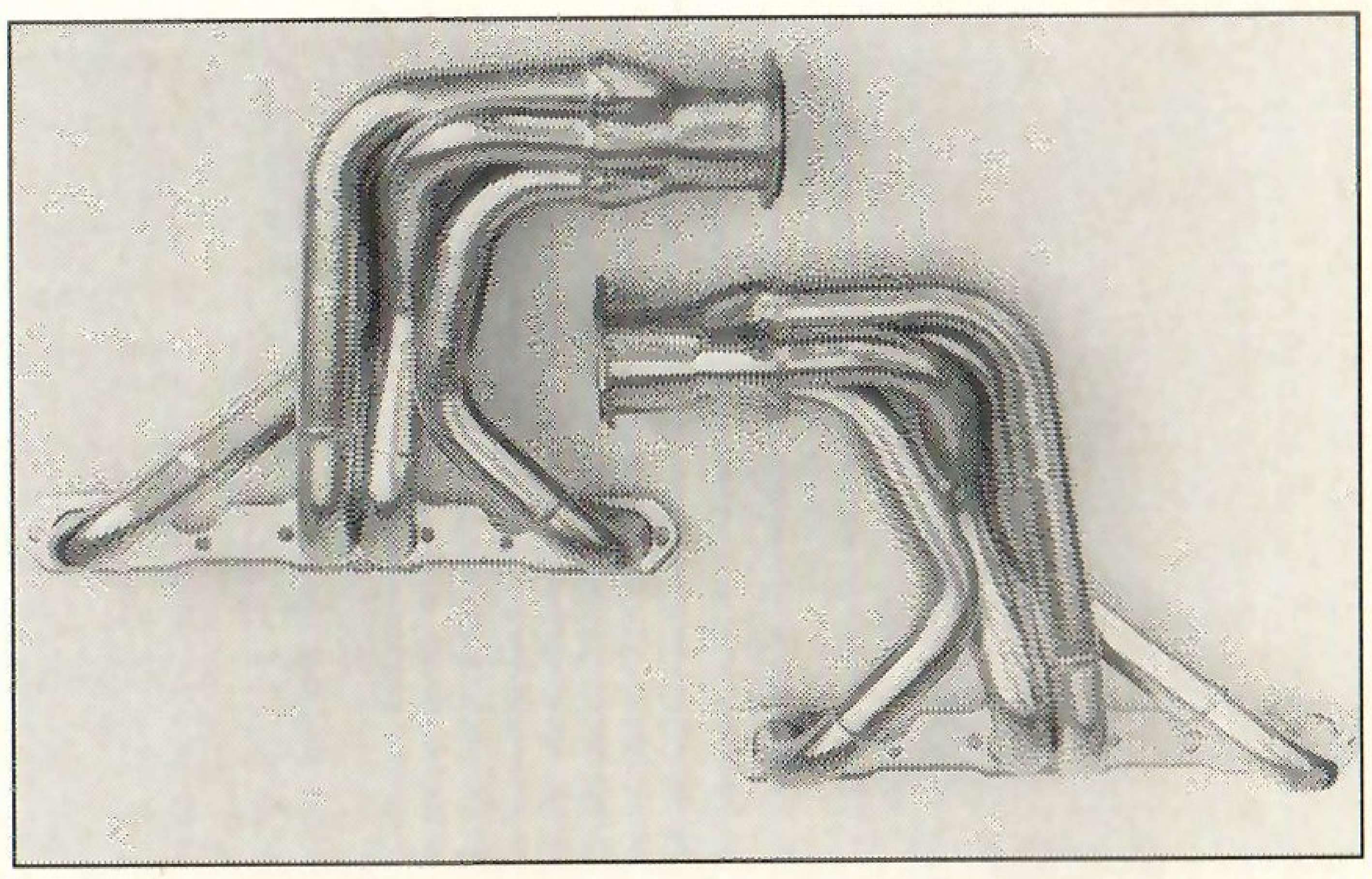
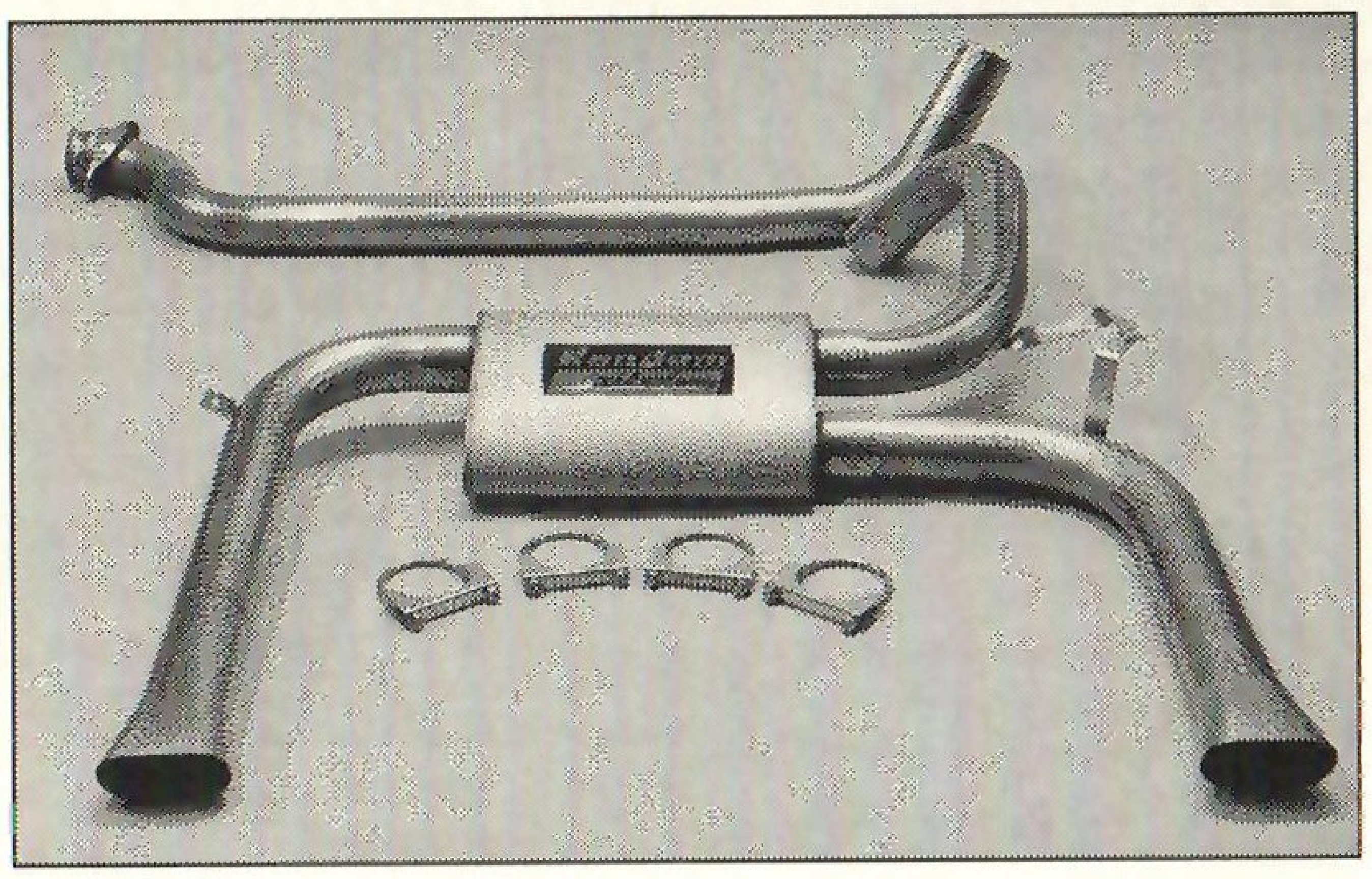
THE PERFORMANCE INFORMANT

HEDMAN HEDDERS



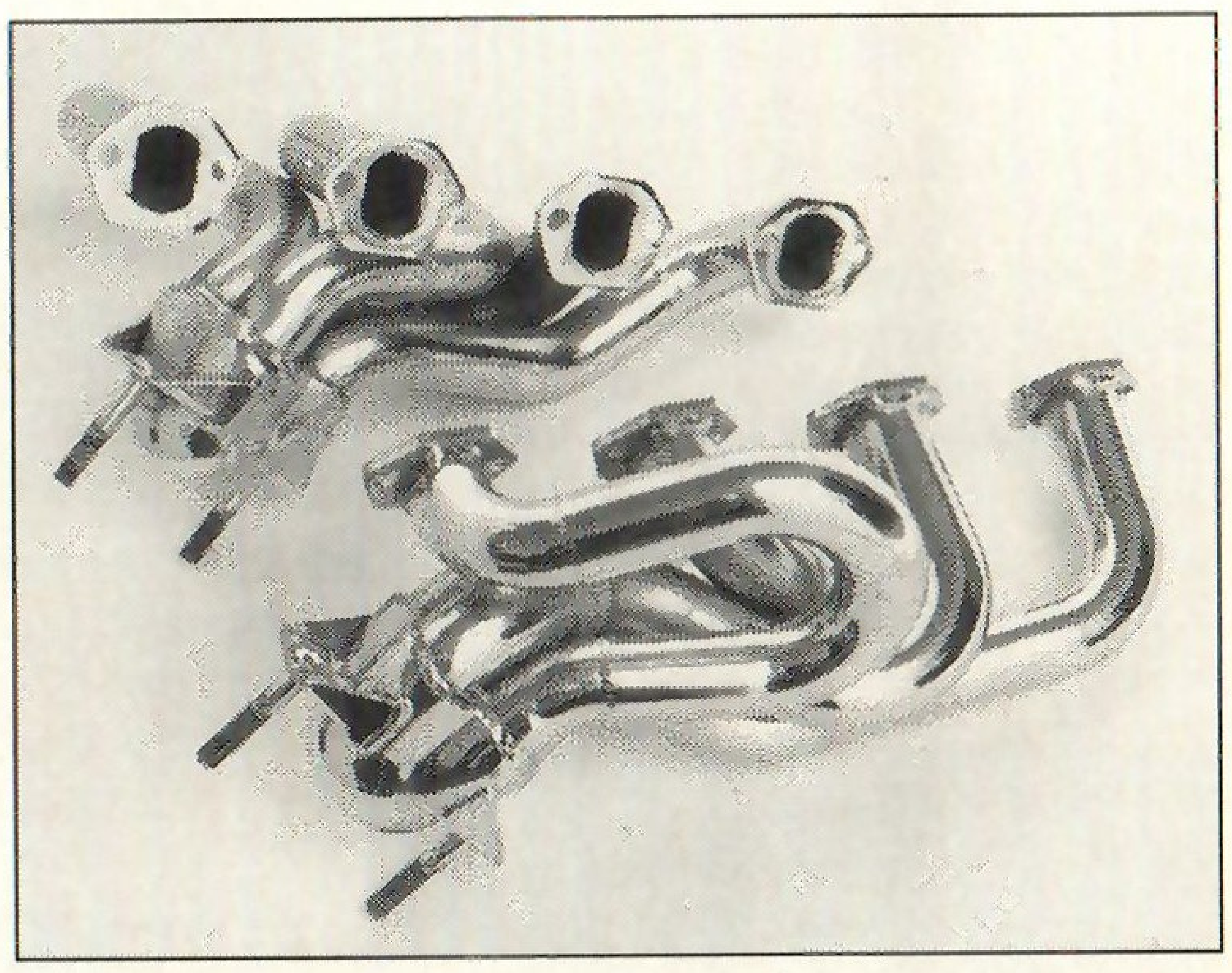
Hedman's new state-of-the-art Tork-Step Hedders feature a unique "step" between the header flange and the collector, which drastically broadens the engine's horsepower and torque curve. The result is increased rpm recovery rates upon gear shifts, more power during downshifts for passing, and a solid increase in low rpm towing and pulling power. Tork-Step Hedders are available for 5.0L Mustangs and Camaros/Firebirds as well as popular 2WD and 4WD trucks. For additional information contact **Hedman Hedders**, 16410 Manning Way, Dept. PHR, Cerritos, CA 90703, (562) 921-0404.

RANDOM TECHNOLOGY

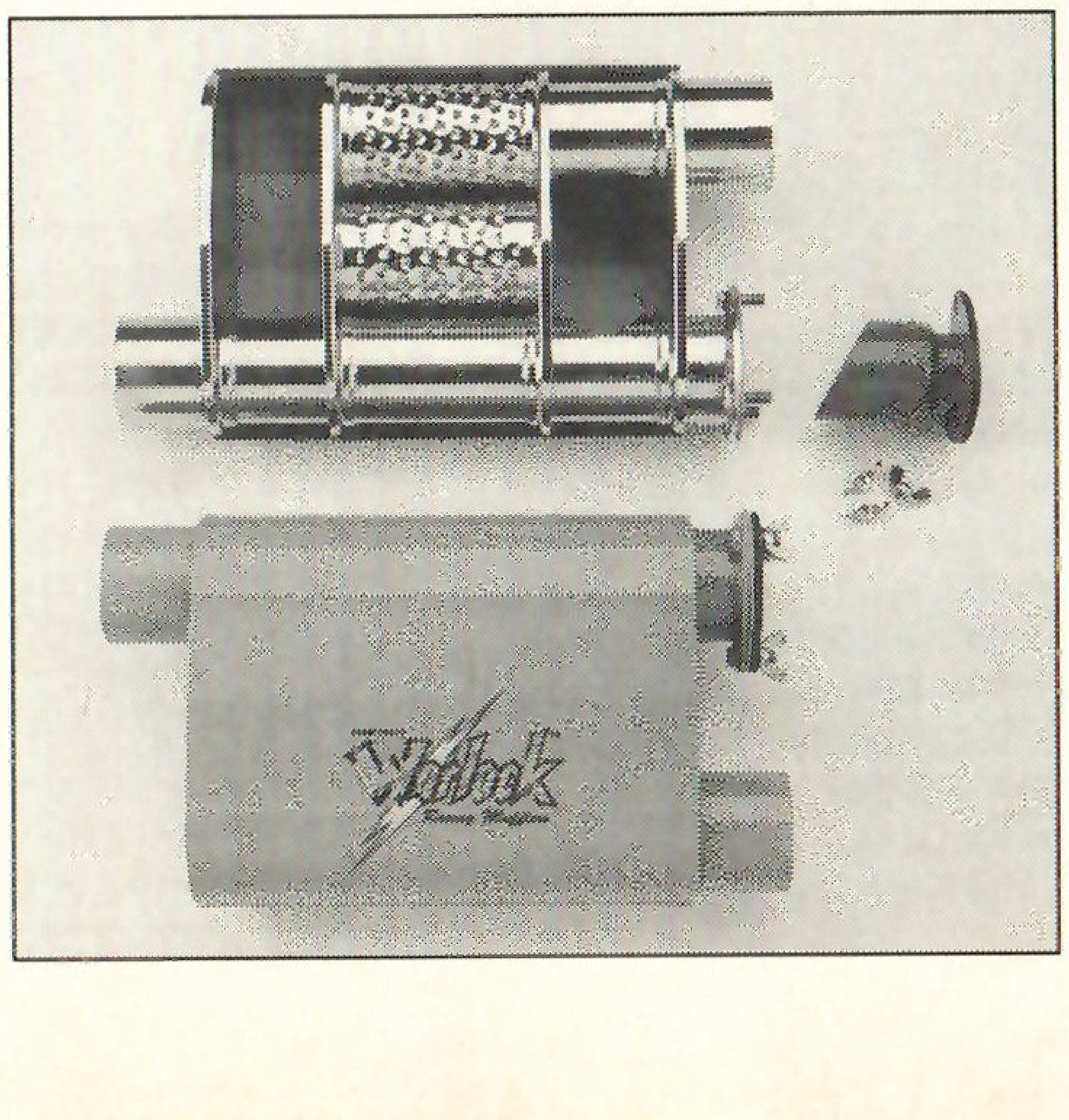


Sound and power is now available for owners of 1993-95 LT1-equipped Camaros and Firebirds from Random Technology. Random's Super High Flow cat-back systems are engineered to produce maximum horsepower and zero backpressure while still maintaining 50-state emissions legal status. Systems are constructed of mandrel bent 304 stainless steel tubing and include a straight-through PowerMax stainless steel muffler with dual 3-inch outlets. The tailpipe tips are designed to add visual appeal to both stock F-bodies and those equipped with aftermarket body kits. Contact **Random Technology**, 1313 Temple Johnson Rd., Dept. PHR, Loganville, GA 30249, (770) 978-0264.

BASSANI

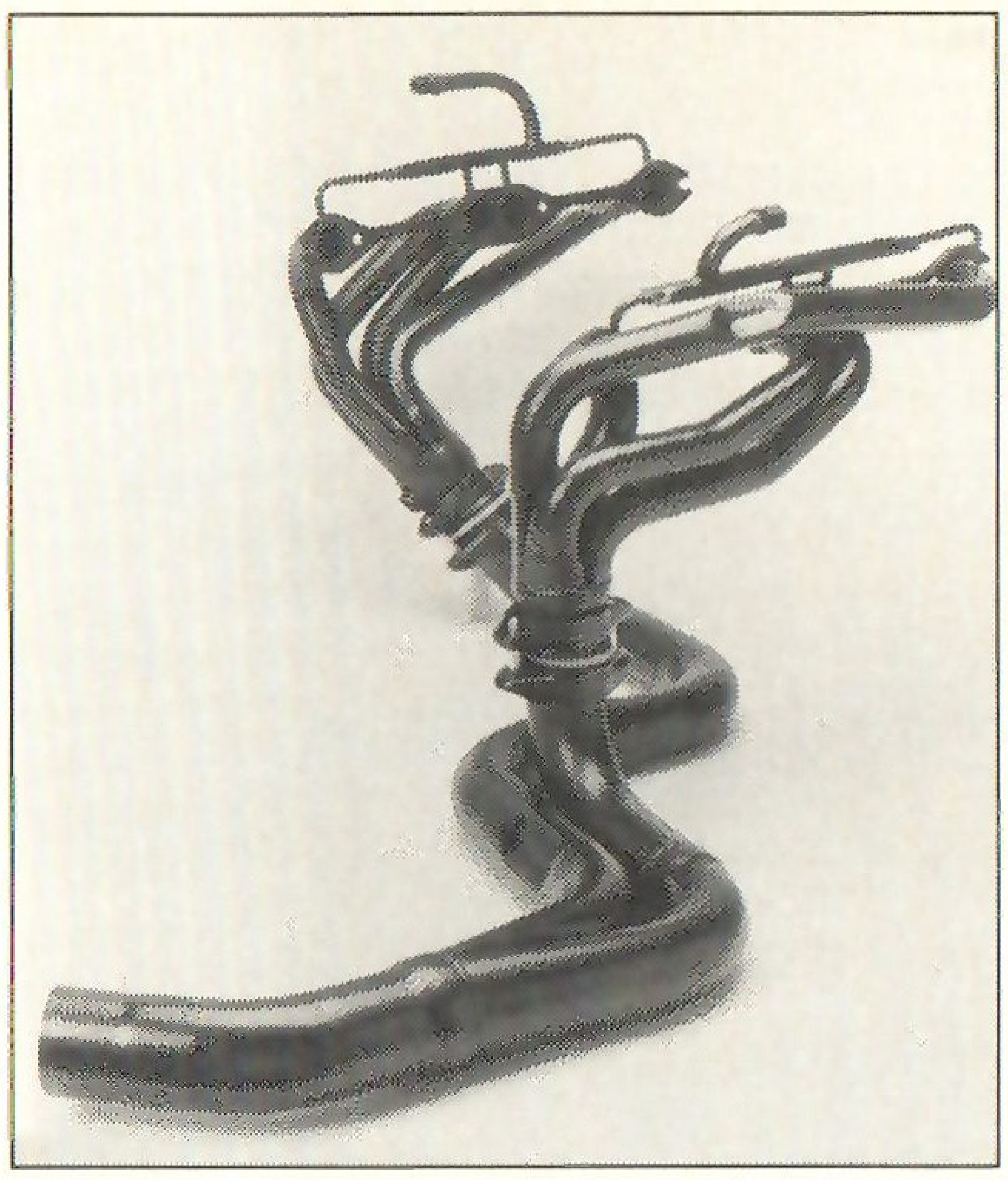


Bassani Manufacturing has created two new offerings to its line of Ford exhaust products. Their equal length short tube headers for 5.0L Mustangs as well as their versions for F-150 trucks can add up to 15 horsepower, while still being completely street legal. Bassani header systems feature their unique "Wave Isolation Collector," which harmonizes the exhaust pulses to induce a scavenging effect. All systems are hand fabricated from heavy-gauge tubing and are MIG welded into a 3-inch, ball-type collector for easy installation. **Bassani Manufacturing**, 2900 E. La Jolla St., Dept. PHR, Anaheim, CA 92806, (714) 630-1821.



FLOWTECH

Flowtech's Warlock By-Pass Series mufflers feature a fully welded 16-gauge case for durability, and can go from street legal to race ready in a matter of seconds. The specially-designed Flow Intensifier directs exhaust gas flow as well as regulating sound when installed in the street configuration. In race configuration, the Warlock operates as a straight-through system for minimal horsepower loss. **Flowtech**, 2605 W. First St., Dept. PHR, Tempe, AZ 85281, (602) 966-1511.



EDELBROCK

Tubular Exhaust Systems from Edelbrock are now available for 1982-96 Chevrolet/Pontiac passenger cars, including the Camaro and Firebird. The headers, which are manufactured from 16-gauge mild steel, will increase the engine's ability to breathe, adding power and torque as well as increasing fuel mileage. Edelbrock systems are complete from the cylinder heads to the catalytic converter, connect directly to all stock emissions equipment, and are street legal in all 50 states. **Edelbrock Corporation**, 2700 California St., Dept. PHR, Torrance, CA 90503, (310) 781-2222.

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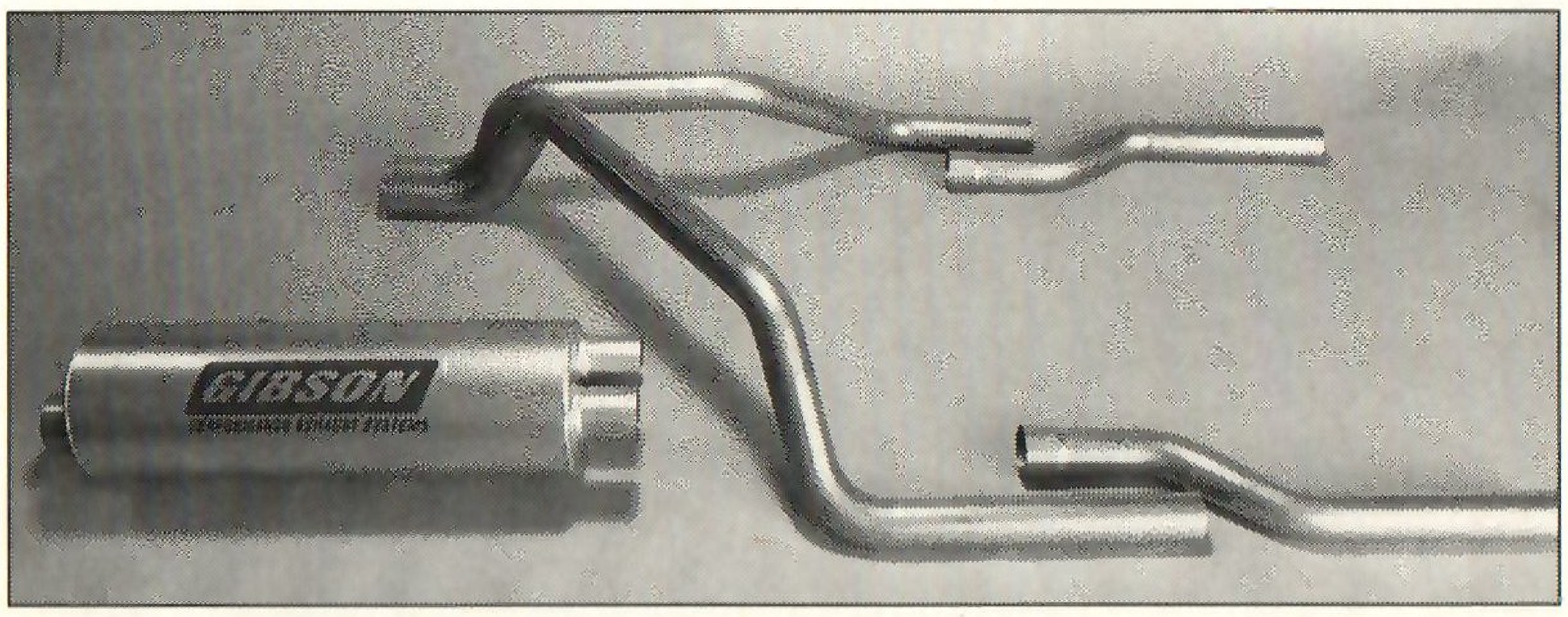

GIBSON PERFORMANCE

Ford, Chevrolet, and/or Chrysler truck owners can increase the power and towing capabilities with the installation of Gibson's new Cat-Back Split Rear Exit Dual Exhaust System. Each kit features a Superflow muffler and mandrel bent heavy-duty aluminized tubing. The easy-to-install exhaust systems are 50-state legal, work with lowered trucks, and even clear trailer hitches or spare tires. For more information contact **Gibson Performance Exhaust**, 3780 Prospect Ave. #B, Dept. PHR, Yorba Linda, CA 92886, (800) 528-3044.

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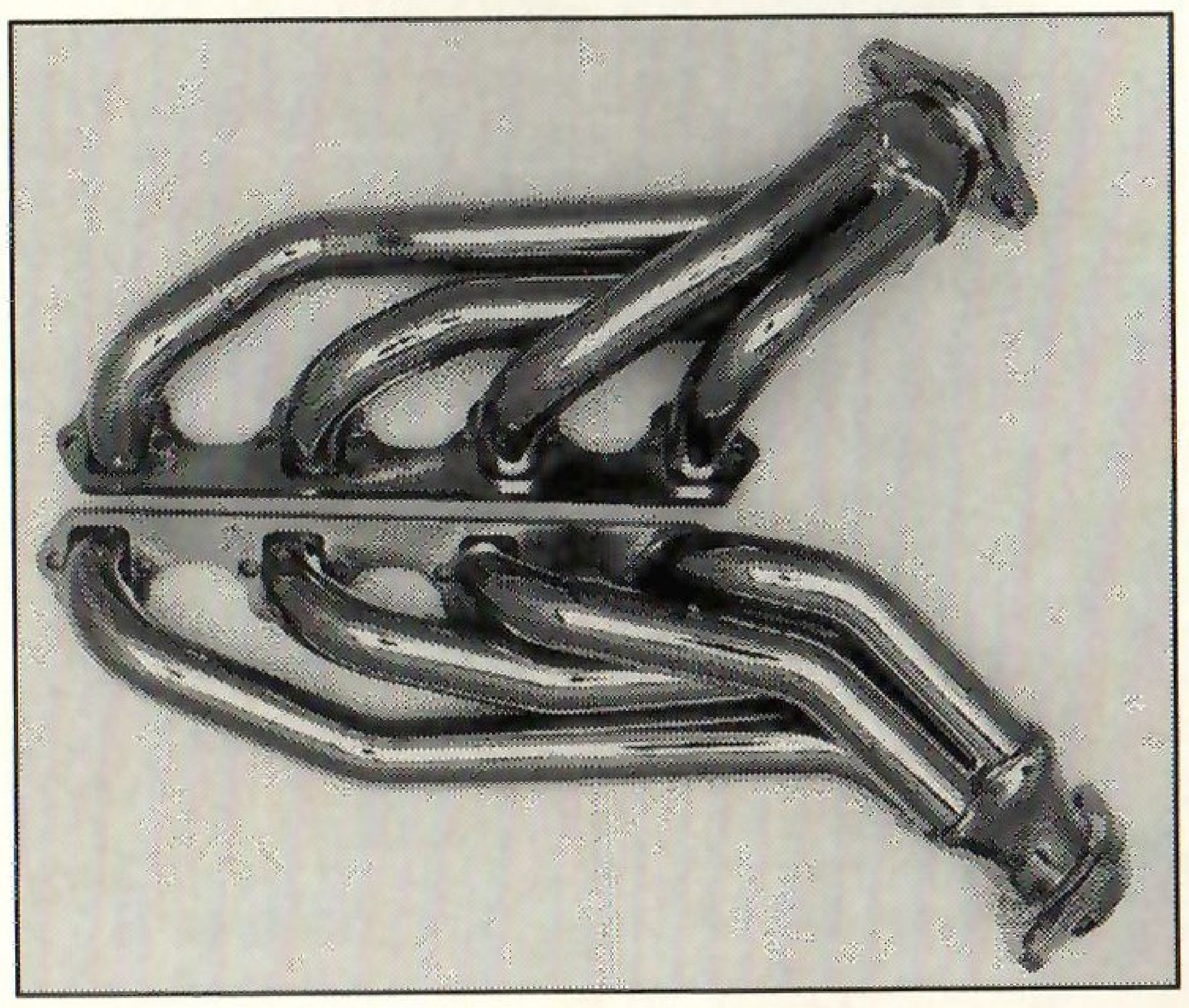
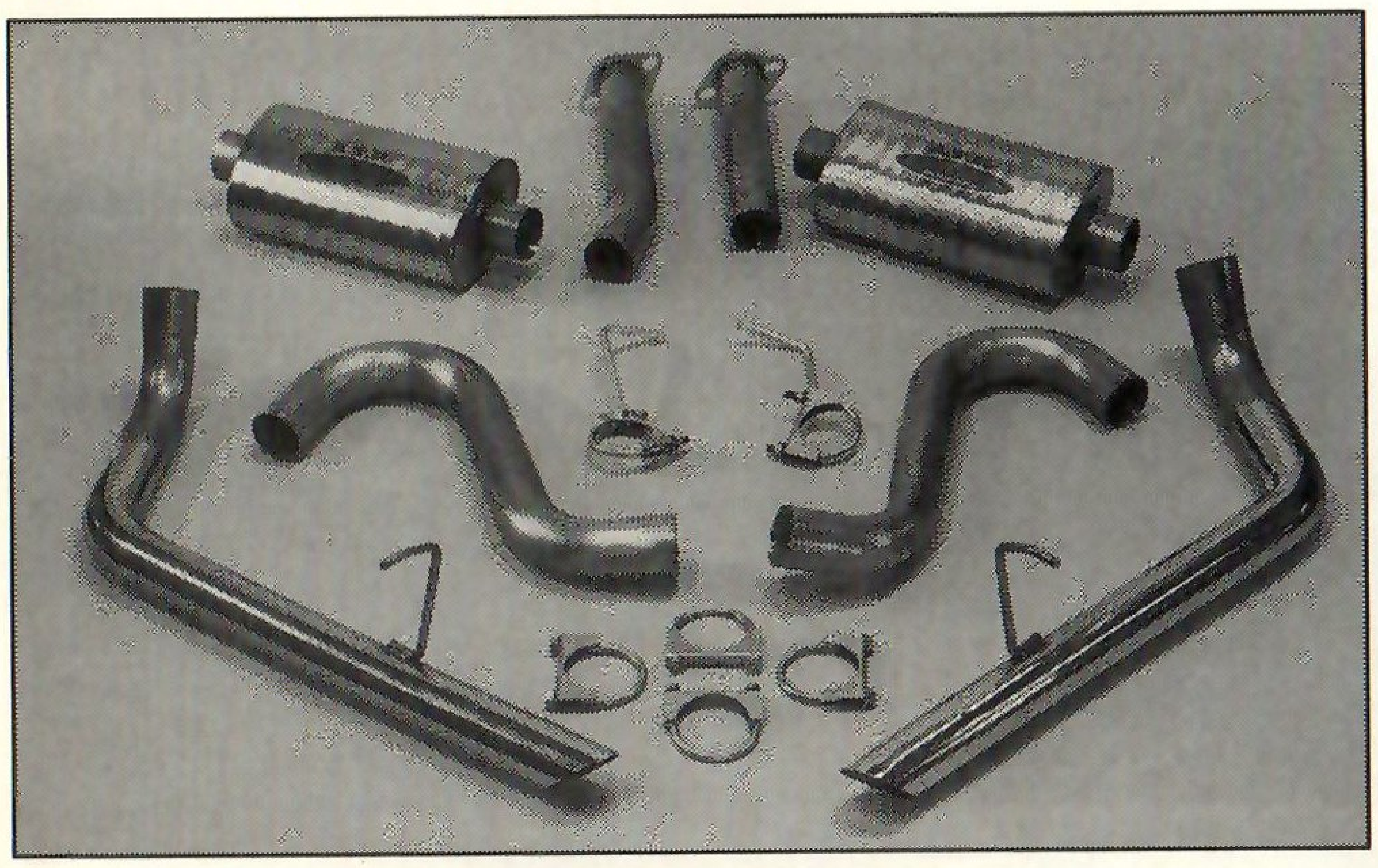


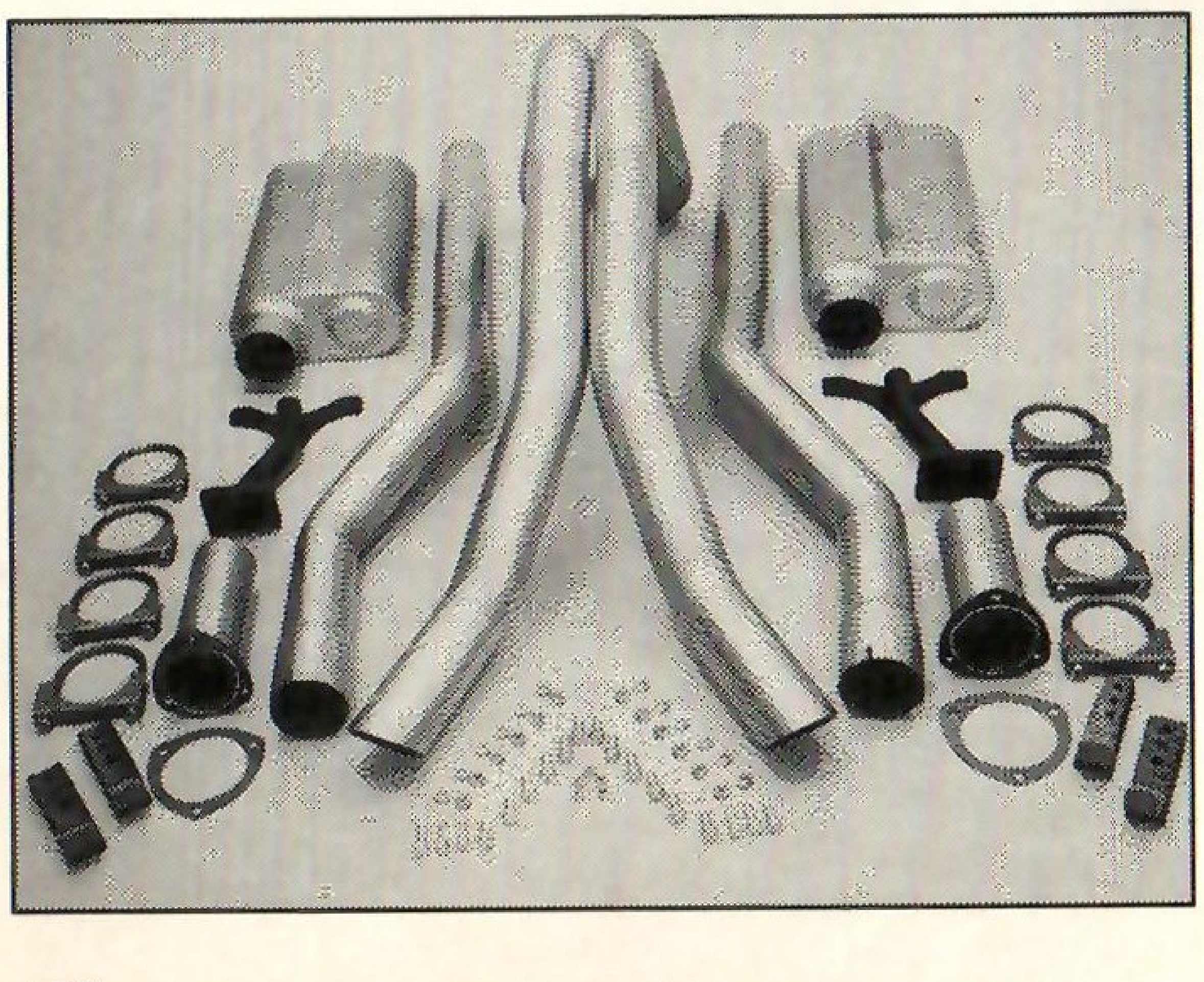
APPLIED TECHNOLOGIES & RESEARCH

Freeing up some additional ponies in 1987-93 Mustangs is as easy as bolting on a cat-back exhaust system from Applied Technologies & Research. The 2.5-inch systems are engineered for maximum power and a perfect fit, thanks to its mandrel bent 304 stainless steel construction. ATR's Powerslot Mufflers are a straight-through design that is almost as free flowing as open exhaust. The systems meet 50-state smog requirements and include stainless steel mounting and installation hardware. Contact **Applied Technologies & Research**, 17040 S. Highway 11, Dept. PHR, Fair Play, SC 29643, (864) 972-3800.



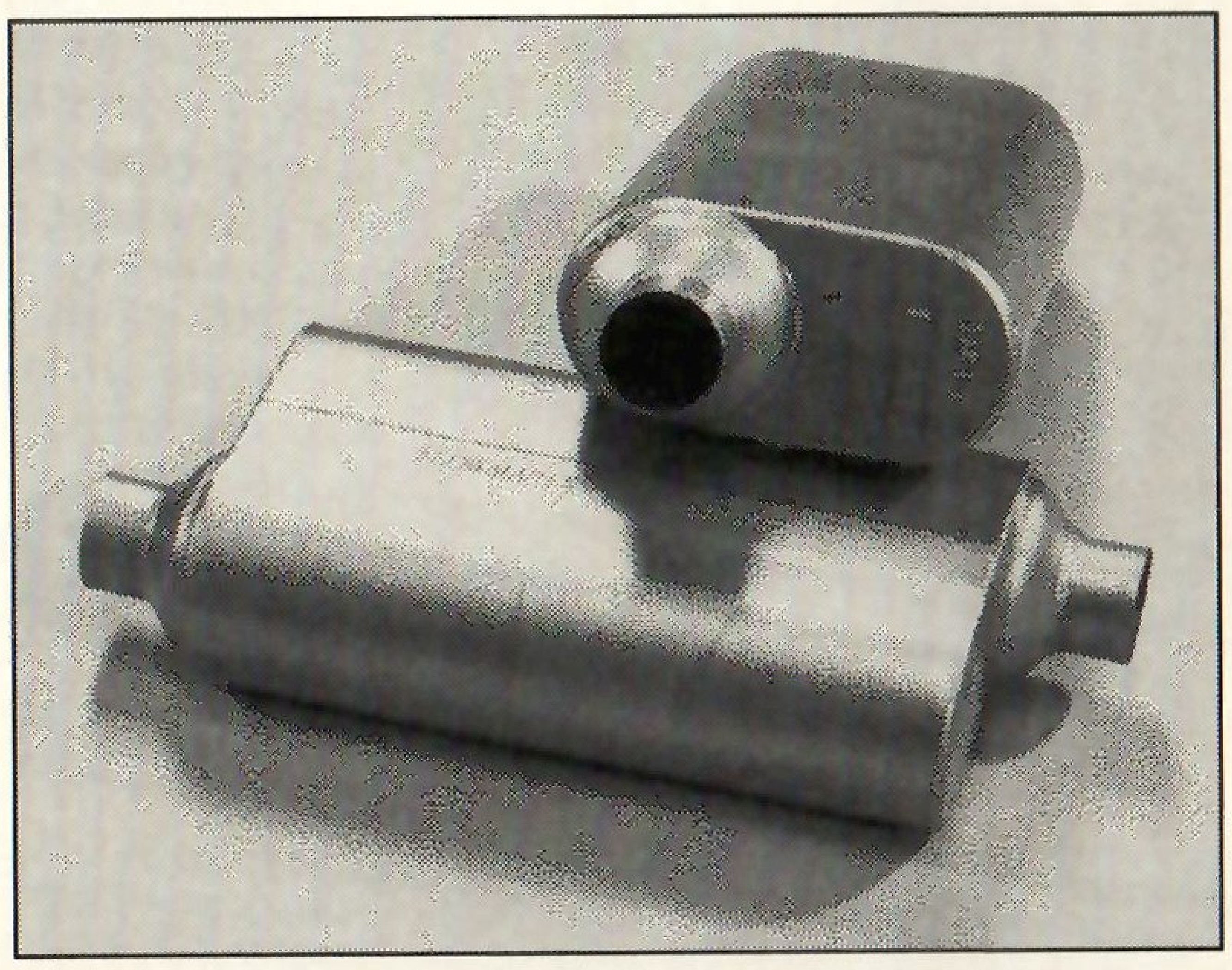
TA PERFORMANCE

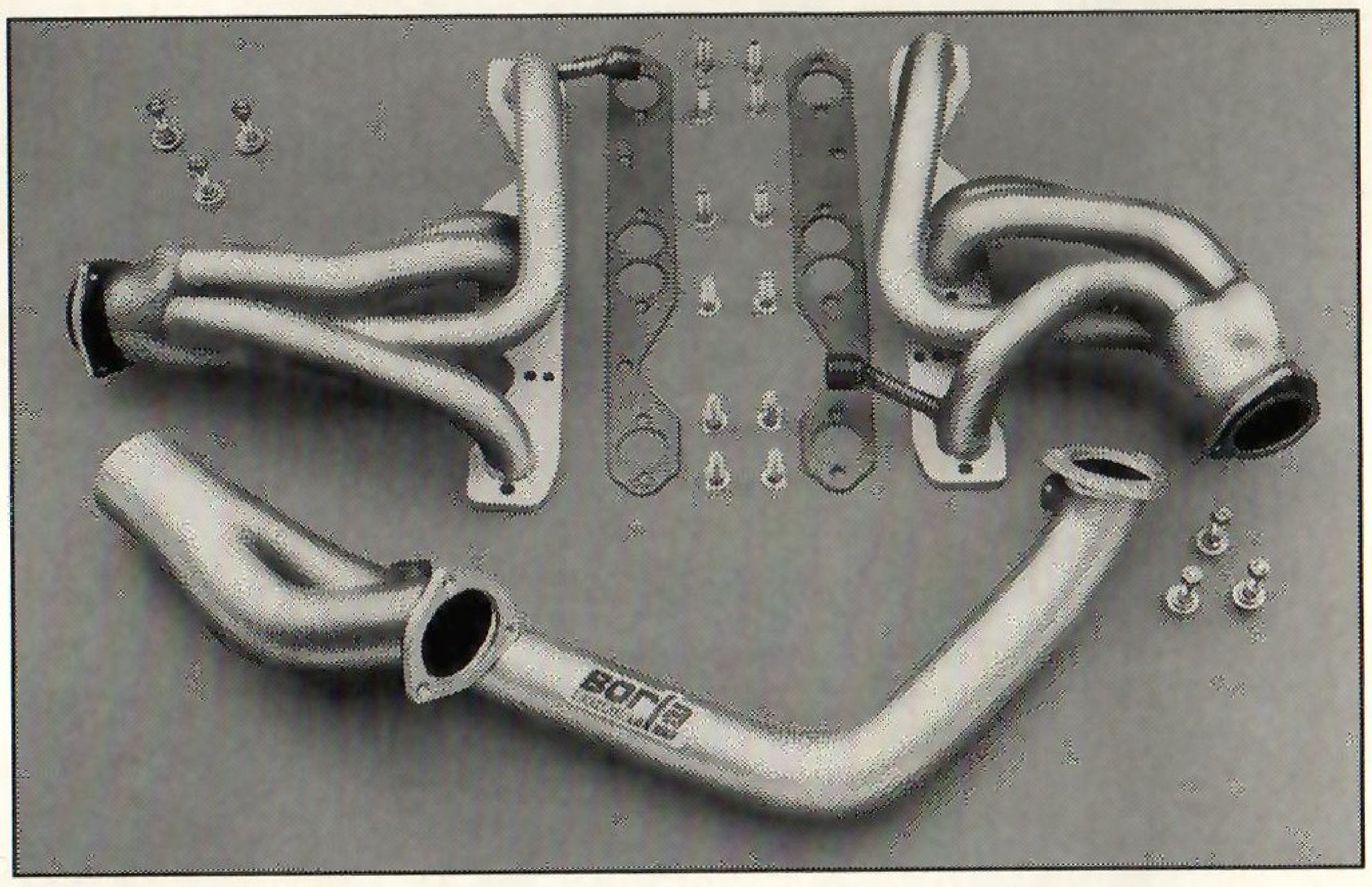
TA Performance Products offers high performance exhaust systems for a variety of muscle cars, both old and new. These mandrel bent systems are available in both 2.5-inch and 3-inch diameters. TA has kits engineered for 1967-81 Camaros/Firebirds, 1964-84 A- and G-Bodied Chevrolets, and E-, B-, and A-bodied Chryslers. Customers can choose between Flowmaster or Dynomax mufflers with TA's performance exhaust systems. Contact **TA Performance Products, Inc.**, 16167 N. 81st St., Dept. PHR, Scottsdale, AZ, 85260, (602) 922-6807.



FLOWMASTER

New from the exhaust experts at Flowmaster are their 30-Series Mufflers, which are available in sizes ranging from 2.5-inch diameter up to mammoth 5-inch versions. These fully aluminized mufflers feature strategically positioned deflectors and collectors to produce maximum scavenging and added torque and horsepower. The 30-Series muffler is constructed with an additional Tuning Chamber that offers improved noise suppression while still producing optimum exhaust flow and minimal backpressure. For more information, contact **Flowmaster, Inc.**, 2975 Dutton Ave., Dept. PHR, Santa Rosa, CA 95407, (800) 544-4761.



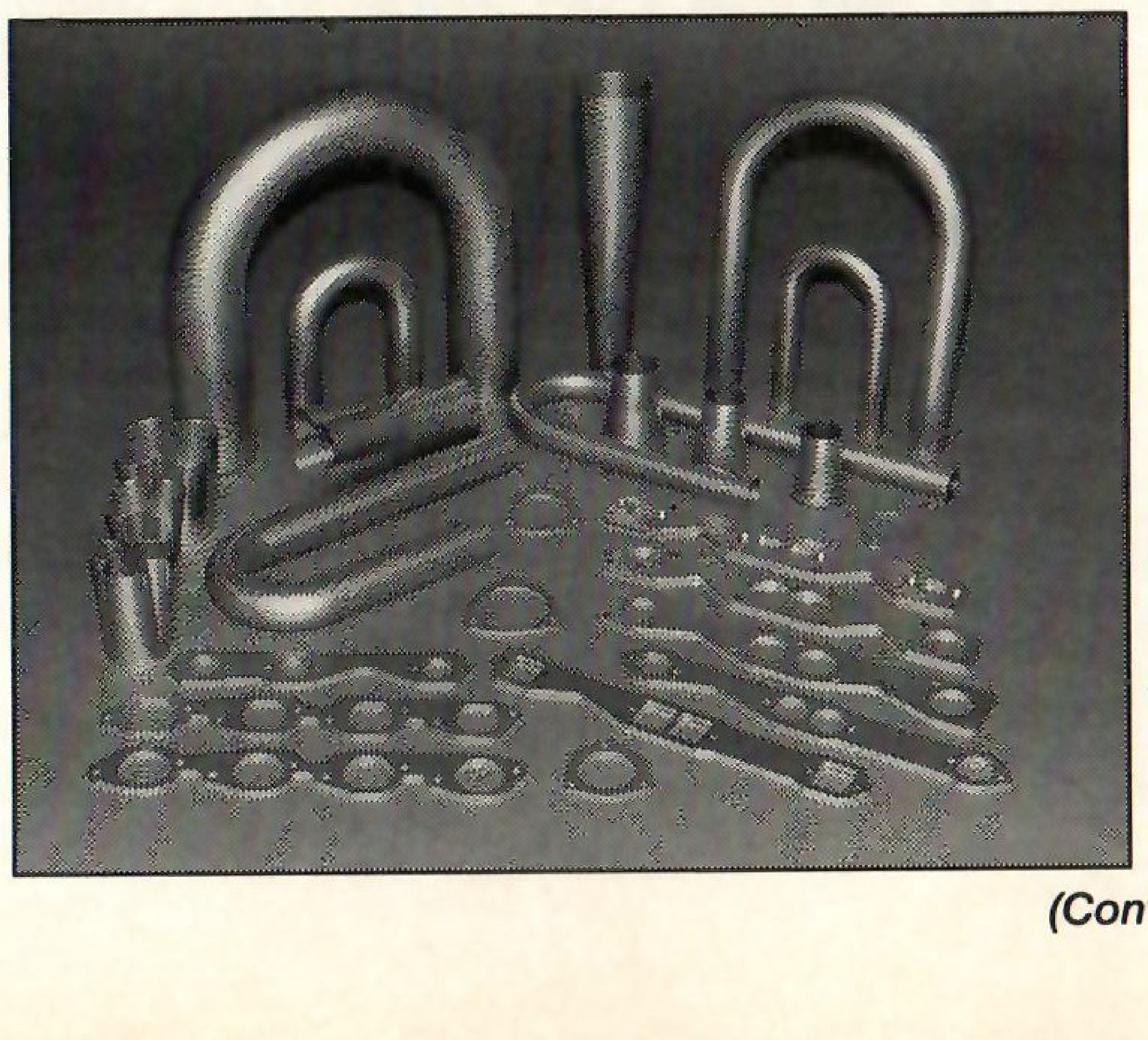


BORLA

Owners of 1993-94 Camaros and Firebirds can add measurable horsepower increases with the addition of Borla's stainless steel tubular headers. Manufactured from T-304 stainless steel, the high-flowing headers feature .5-inch thick flanges and 1.625-inch primary tubes that flow into a 2.25-inch Y-pipe. All necessary mounting hardware and gaskets are included, and Borla's new header system also carries the company's Million-Mile Warrantee. **Borla Performance Industries**, 5901 Edison Dr., Dept. PHR, Oxnard, CA 93033, (805) 986-8600.

HEADERS BY ED

As long-time builders of all types of automotive, tractor pull, mudbog, and dyno systems, Headers by Ed has a new catalog stuffed with ready-to-bolt-in tubes, build-it-yourself packages (pictured), and header parts for over 110 different engine and car combinations. You'll even find a great deal of important information on header design, fabrication, and performance advice. Headers are available for four- and six-cylinders (V-6 included), as well as V-8s equipped with OEM or aftermarket cylinder heads. **Headers by Ed, Inc.**, 2710 16th Ave. South, Dept. PHR, Minneapolis, MN 55407, (612) 729-2802.



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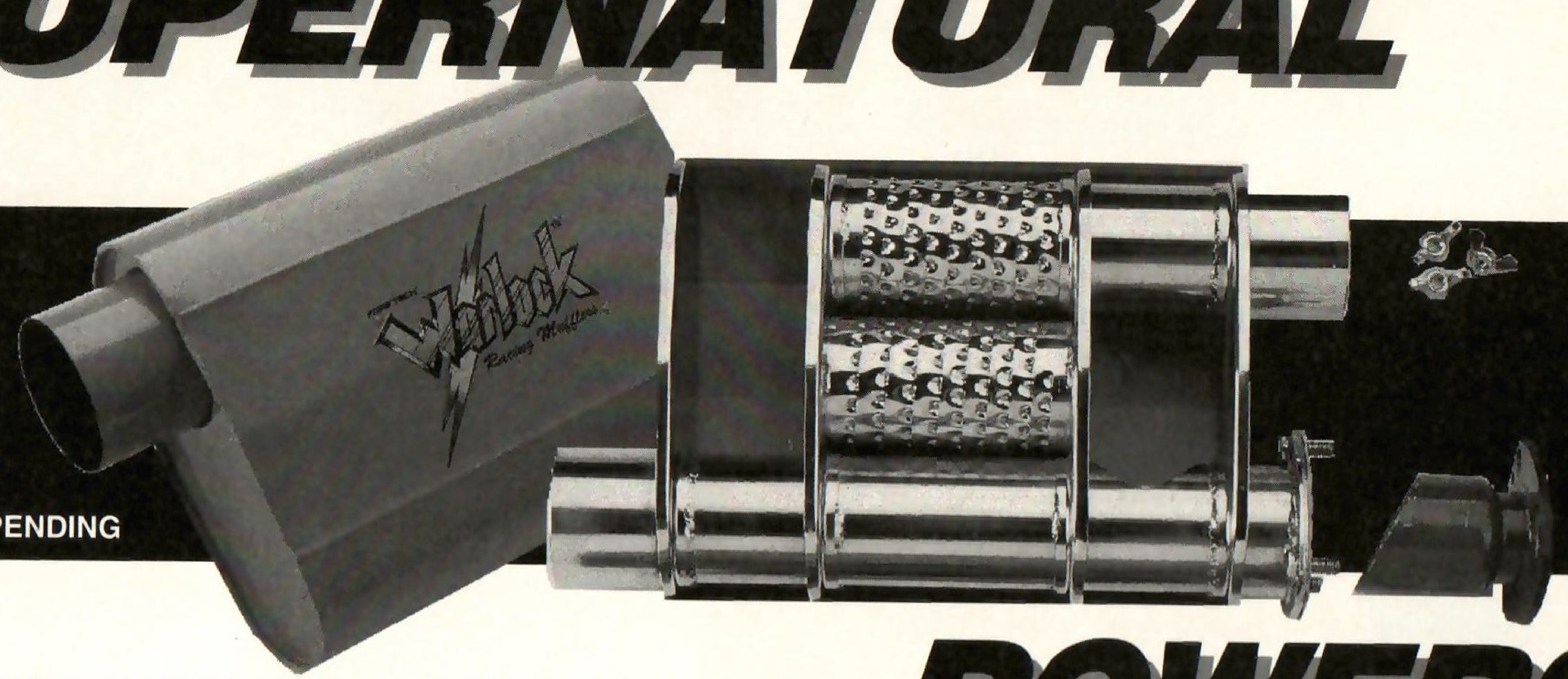
SUPERNATURAL



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The NitrousWorks
A BG300 COMPANY

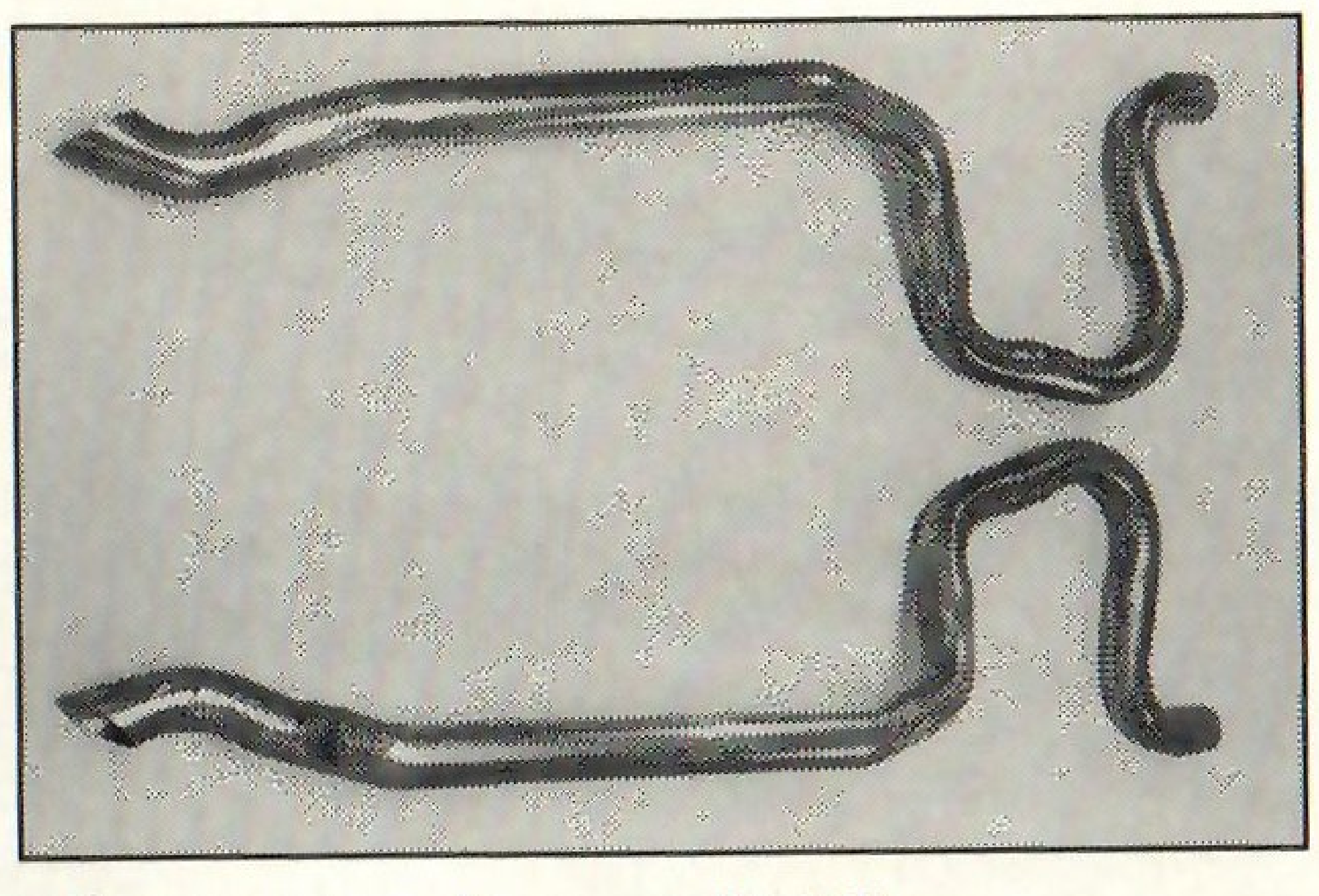
706•864-7009 FAX:706•864-2206

NOT LEGAL FOR SALE OR USE ON POLLUTION CONTROLLED MOTOR VEHICLES.

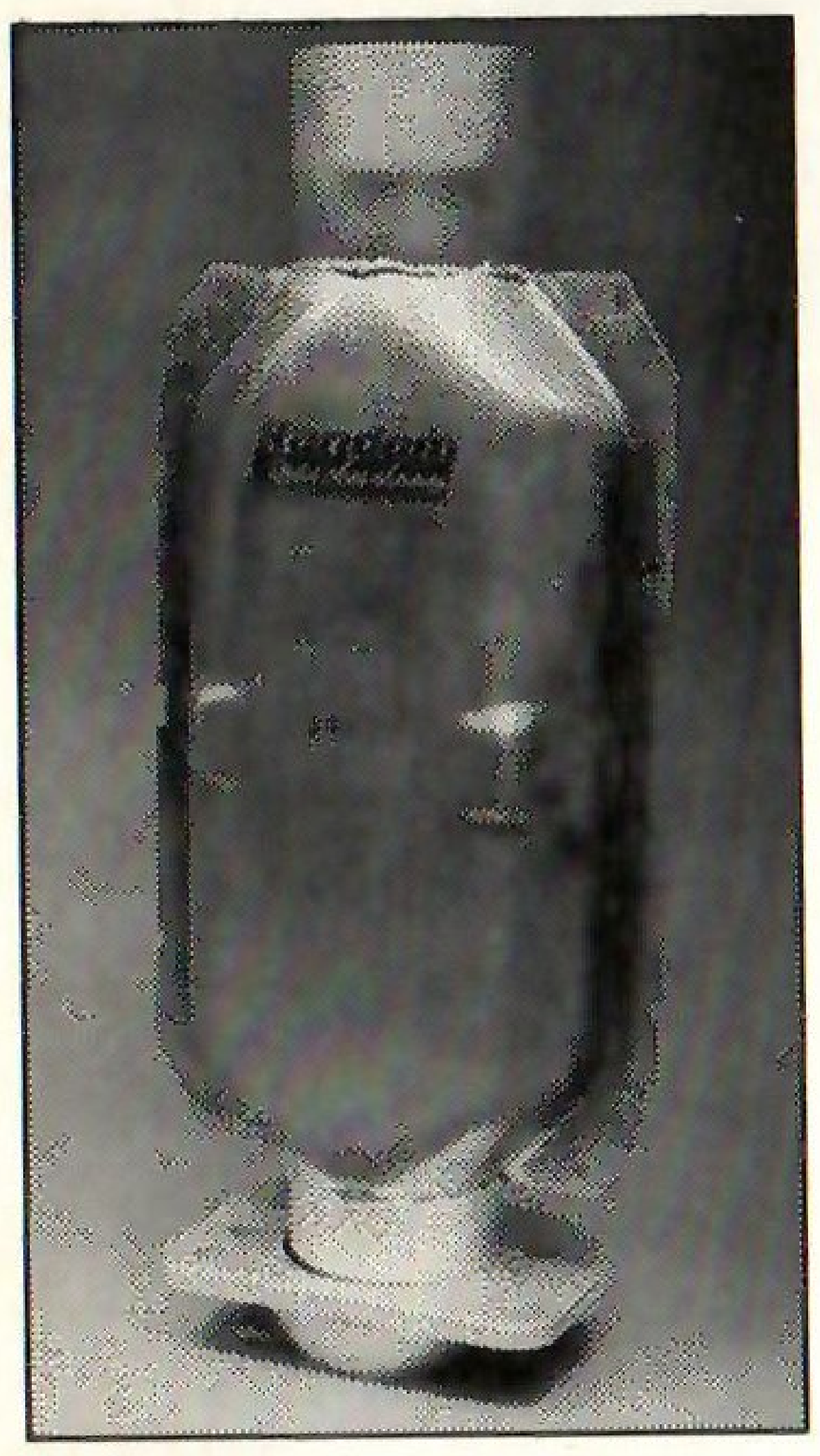
THE PERFORMANCE INFORMANT

(Continued from page 76)

YEAR ONE



Searching for replacement tail pipes for that rare 1966-67 Hemi Charger, Year One now offers steel or aluminized pipes for '66-67 Chargers equipped with 426ci Hemi engines. The 2.25-inch tail pipes are manufactured in left and right sides, and feature the correct shape and length to clear the rear valance for an excellent fit. Contact **Year One, Inc.**, 4559 Granite Dr., Dept. PHR, Tucker, GA 30084, (800) 950-9503.

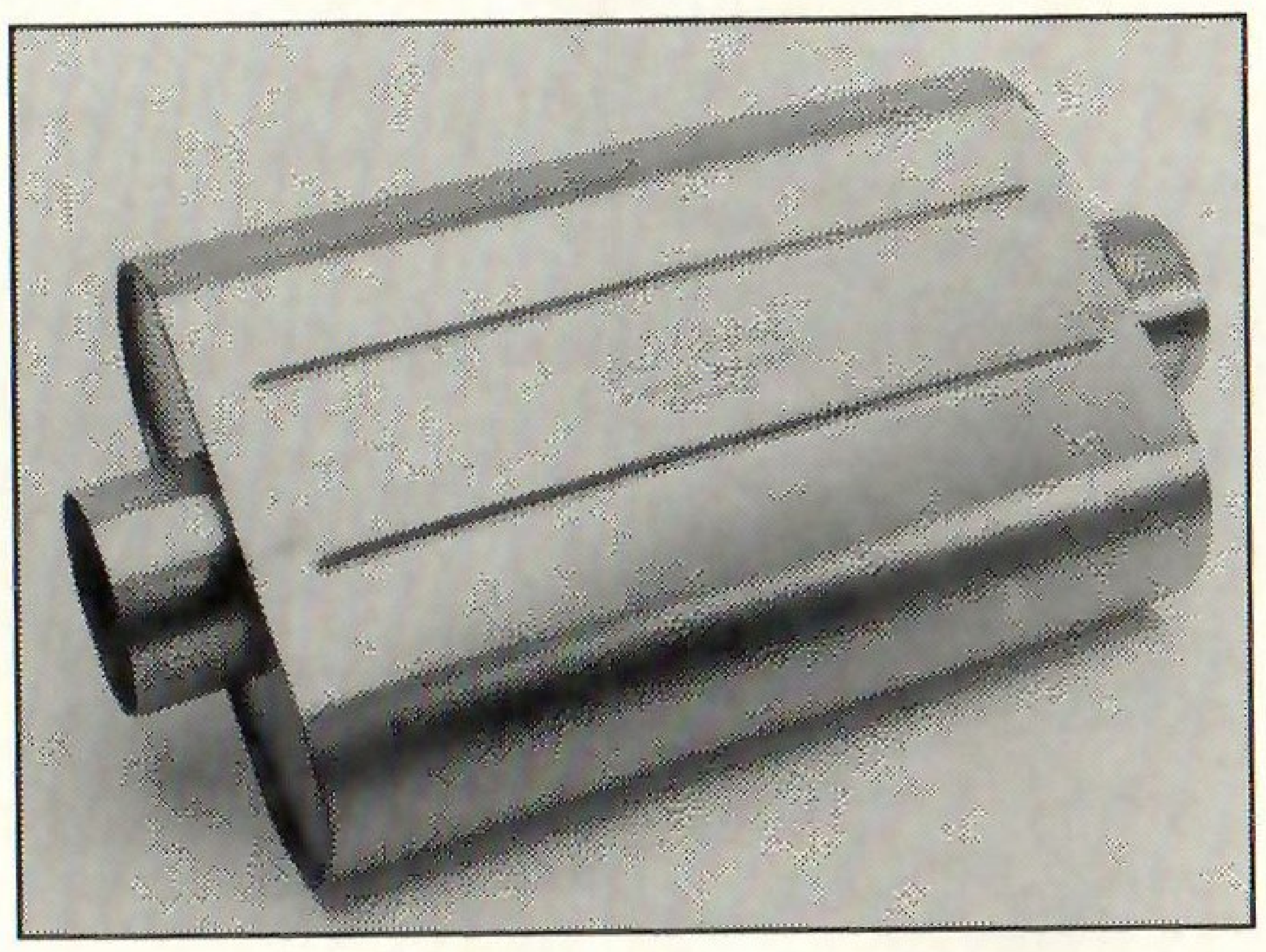


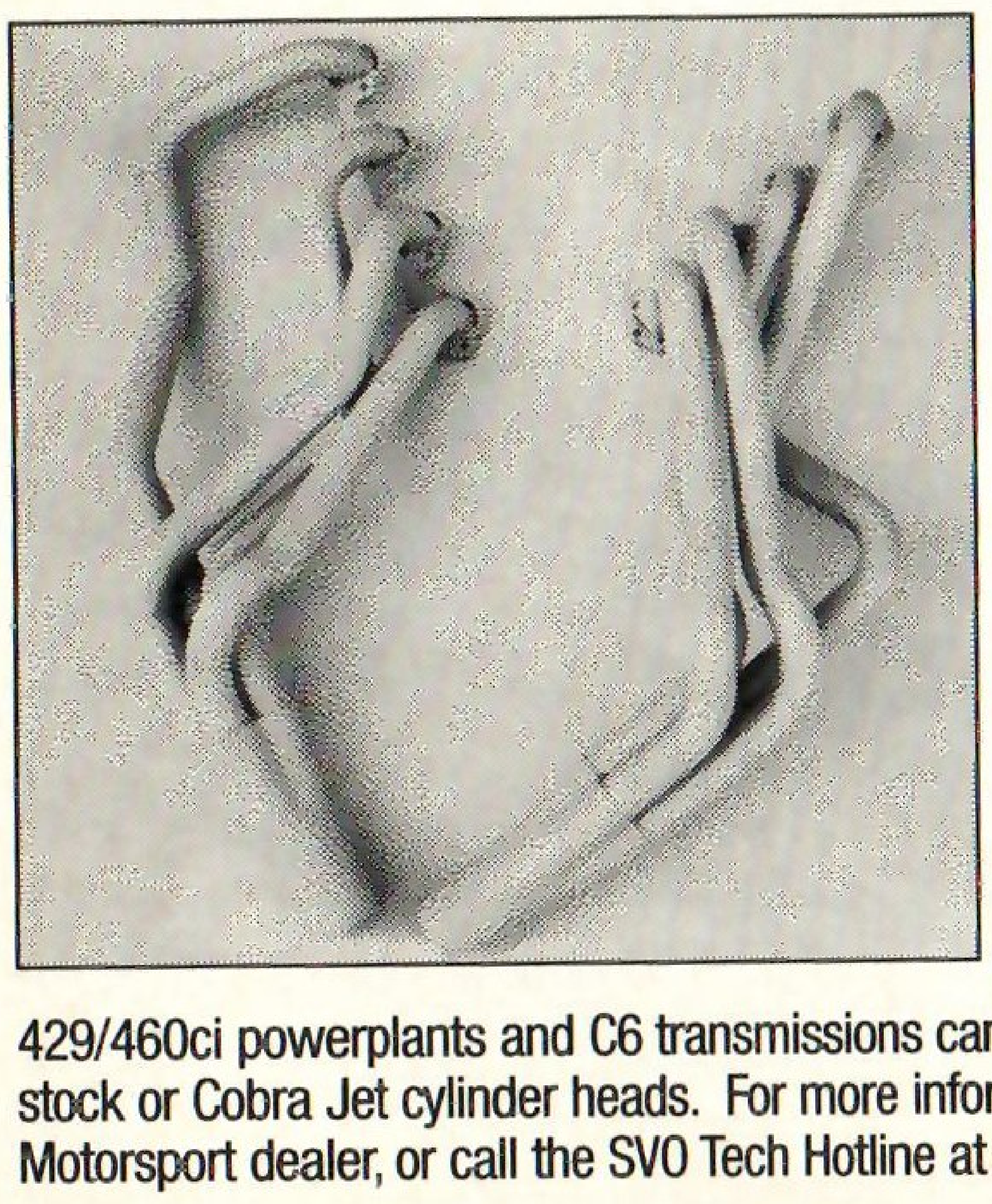
RANDOM TECHNOLOGY

Higher flow capacities and 50-state legality can be retained with a set of Random Technology's Super High Flow catalytic converters. Over 500cfm of exhaust flow is capable, thanks to Random's special MaxFlow bricks, which control emissions with minimal disruption to exhaust flow. Models are available with sizes ranging from 2-inch inlets and outlets up to 3.5-inch versions. Random can also provide units with custom inlets and outlets. For additional information contact **Random Technology**, 1313 Temple Johnson Rd., Dept. PHR, Loganville, GA 30249, (770) 978-0264.

EDELBROCK

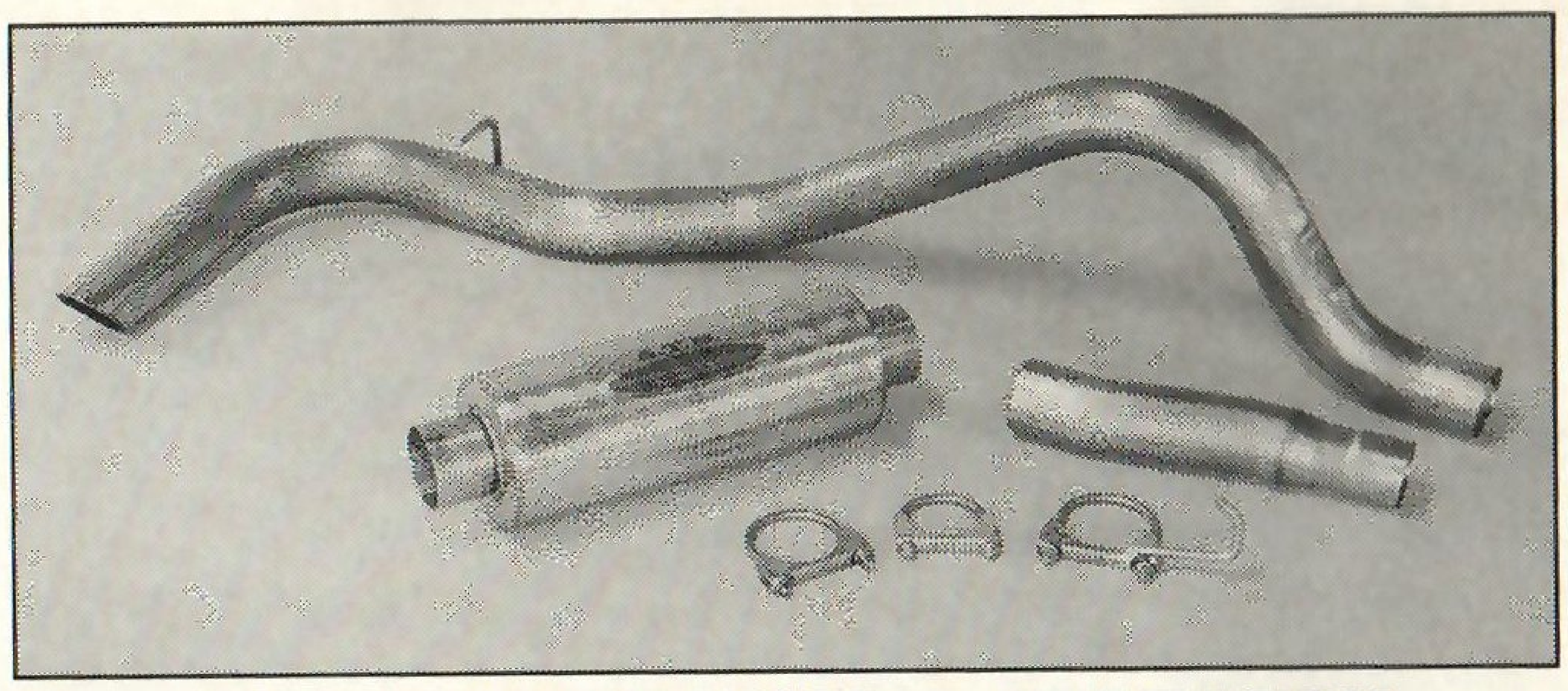
The RPM Series Mufflers from Edelbrock feature a unique Tru-Flo core design that increases performance as well as improving sound quality. The RPM Series Mufflers utilize 18-gauge brushed stainless steel casings with strengthening ribs and a perforated steel core. A special ceramic packing capable of withstanding 1,800 degree temperatures wraps the core, giving the RPM Series a long service life. Versions are available in various case sizes with inlet and outlet configurations ranging from 2-inch to 3-inch. Contact **Edelbrock Corporation**, 2700 California St., Dept. PHR, Torrance, CA 90503, (310) 781-2222.





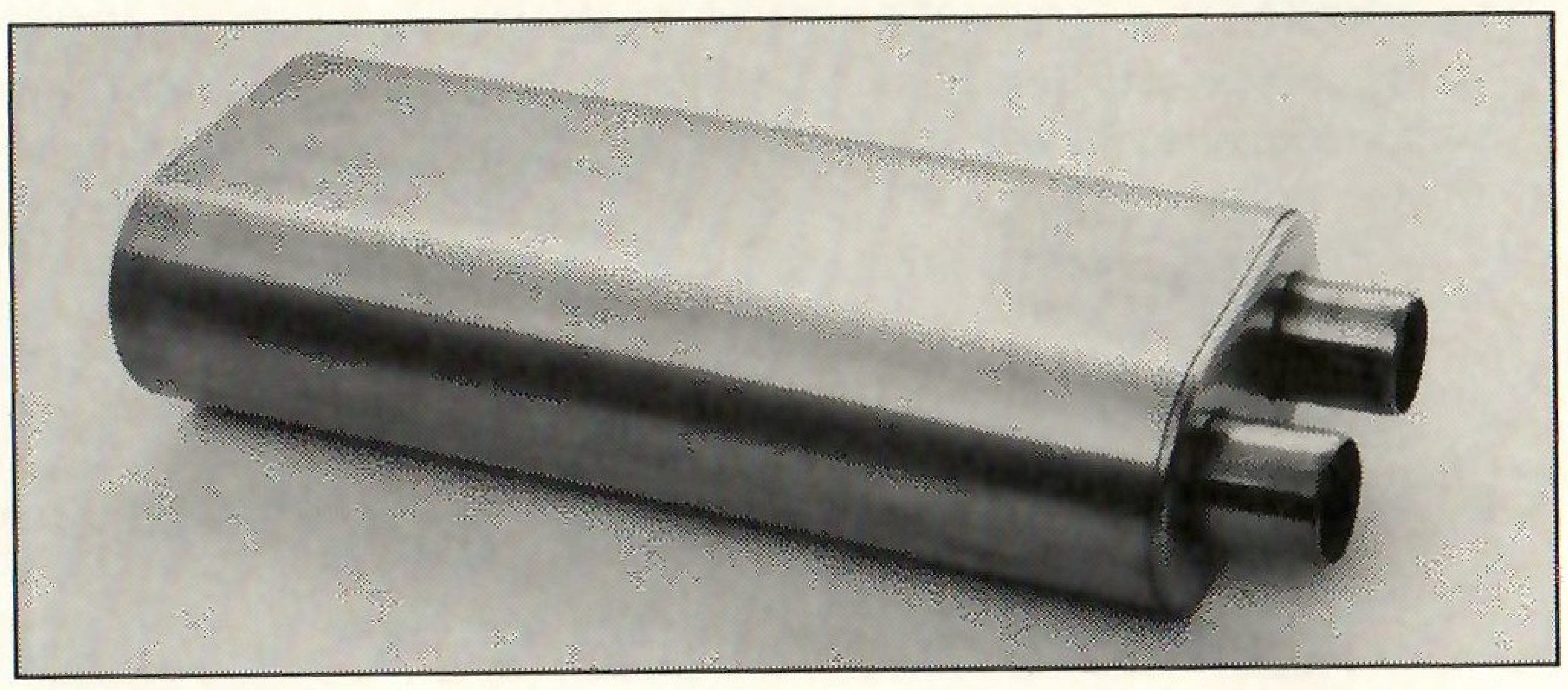
FORD MOTORSPORT

Ford Motorsport announces the release of four new long-tube race headers designed for the 1979-94 Mustang. Each example is constructed from 18-gauge mild steel, and can be used with cast iron as well as aluminum cylinder heads. Owners of 5.0L/302 equipped Mustangs can choose from 1.625 or 1.75-inch versions, while 5.8L/351W-motored cars will opt for the 1.75-inch primaries. Mustangs with transplanted 429/460ci powerplants and C6 transmissions can use SVO's 2-inch primaries with stock or Cobra Jet cylinder heads. For more information contact your nearest Ford Motorsport dealer, or call the SVO Tech Hotline at (313) 337-1356.



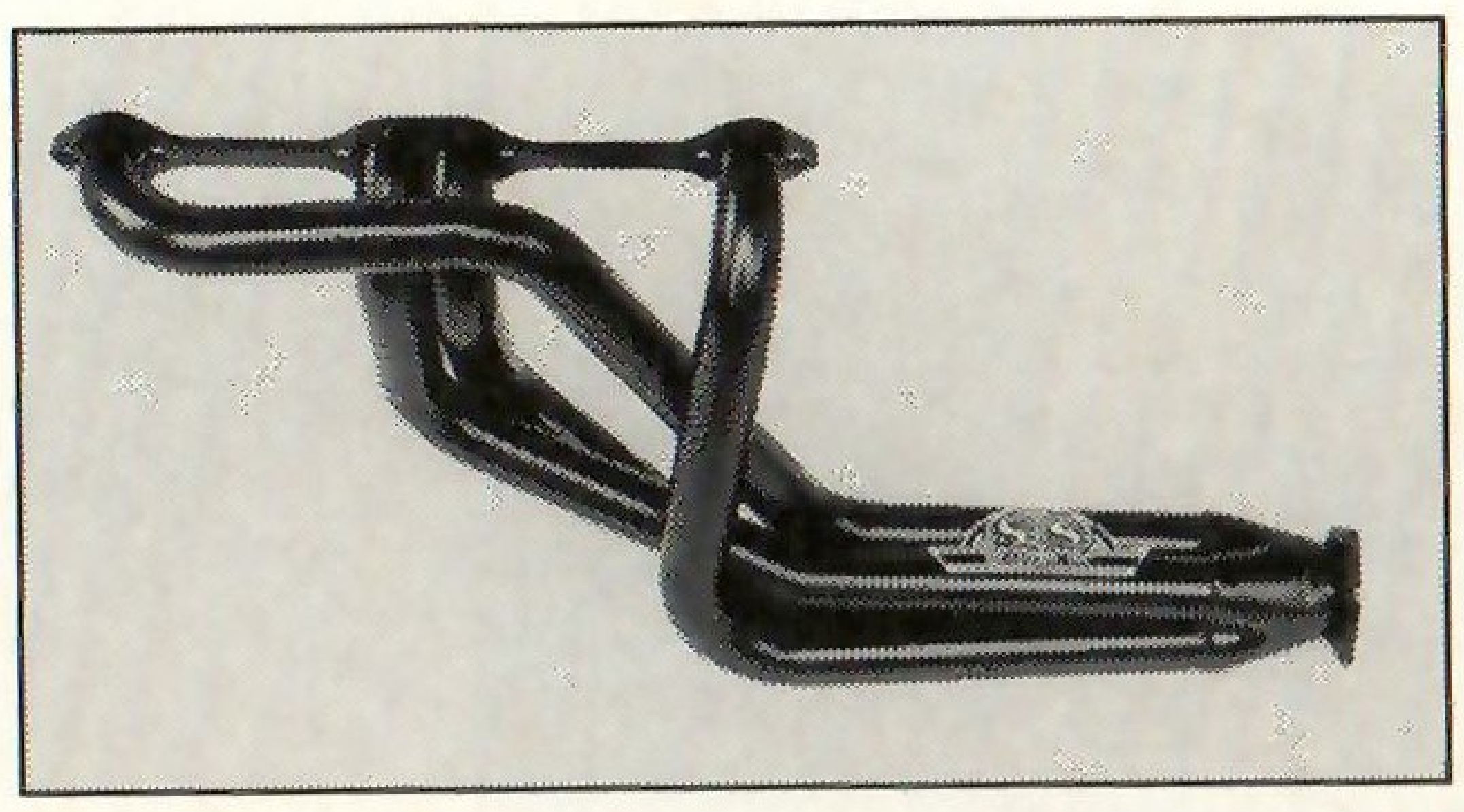
APPLIED TECHNOLOGIES & RESEARCH

Applied Technologies & Research breathes new life into 1995 Dodge Dakota trucks when the restrictive factory exhaust is replaced with ATR's new stainless steel cat-back system. The mandrel bent system features ATR's exclusive Powerslot muffler, which is so efficient that the system behaves like an open exhaust. The result is maximum power, OEM quality fit, and just the right level of sound control, all in a package that is 50-state legal. Contact **Applied Technologies & Research**, 17040 S. Highway 11, Fair Play, SC 29643, (864) 972-3800.



BASSANI

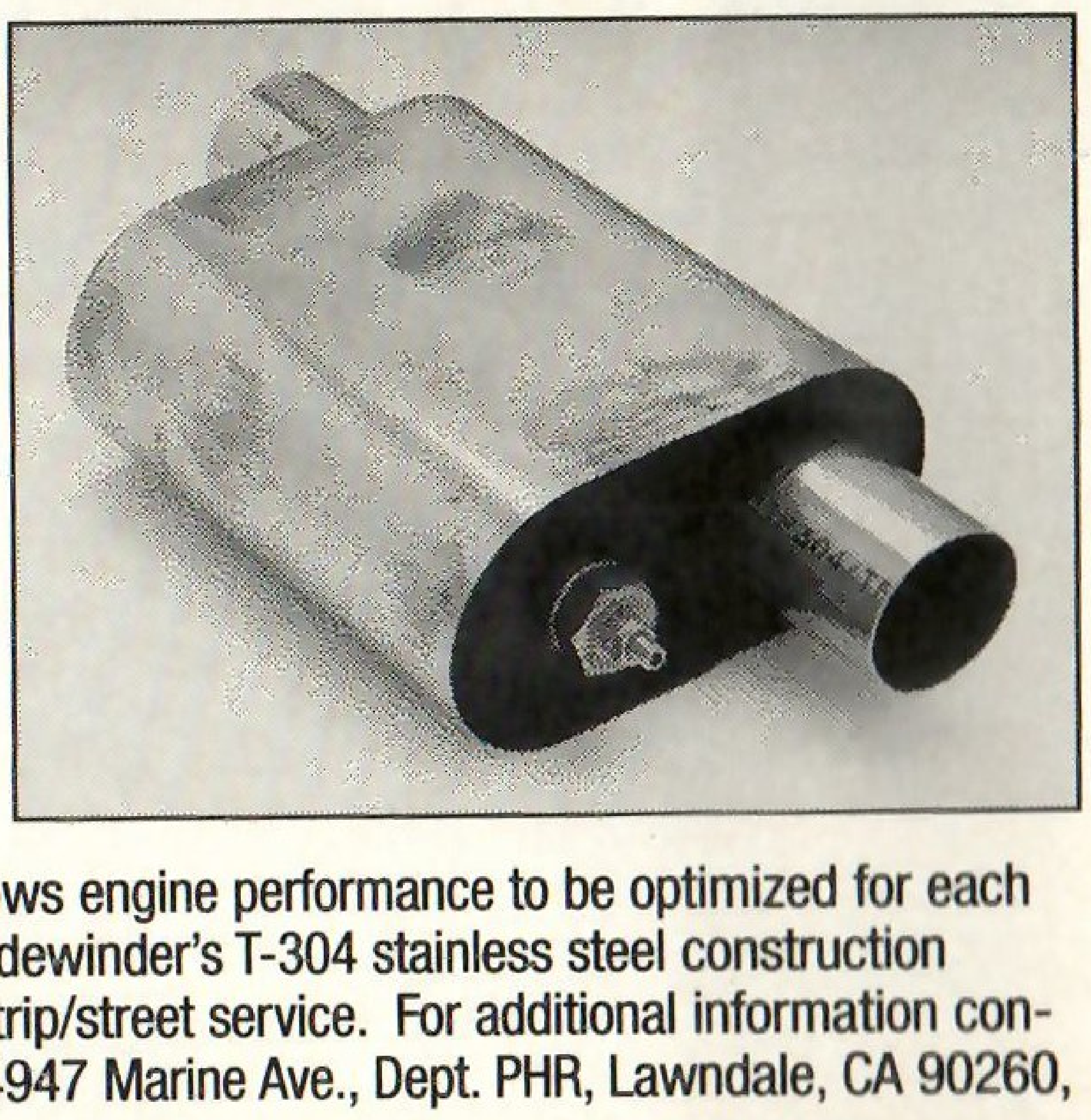
The Quiet Thunder Muffler series from Bassani Manufacturing utilizes a unique interior design that uses exhaust pulse to create a scavenging effect while lowering noise emissions. Dual, straight-through baffles provide maximum flow, while "tuned" louvers improve flow and eliminate backpressure. Quiet Thunder Mufflers are available in a variety of case lengths and inlet/outlet sizes. Contact **Bassani Manufacturing**, 2900 E. La Jolla St., Dept. PHR, Anaheim, CA 92806, (714) 630-1821.



S&S HEADERS

S&S now has a system for popular '67-69 Camaro and '68-74 Nova applications. These mandrel bent, equal-length, 1-3/4-inch headers have thick CNC plasma-cut flanges. They come complete with street hookups, gaskets, and special header bolts for American-made performance applications. Dealer inquiries welcome. **S&S Headers**, Inc., 6042 N. 53rd Dr., Dept. PHR, Glendale, AZ 85301-7775, (602) 847-9000.

DECKER ENGINEERING

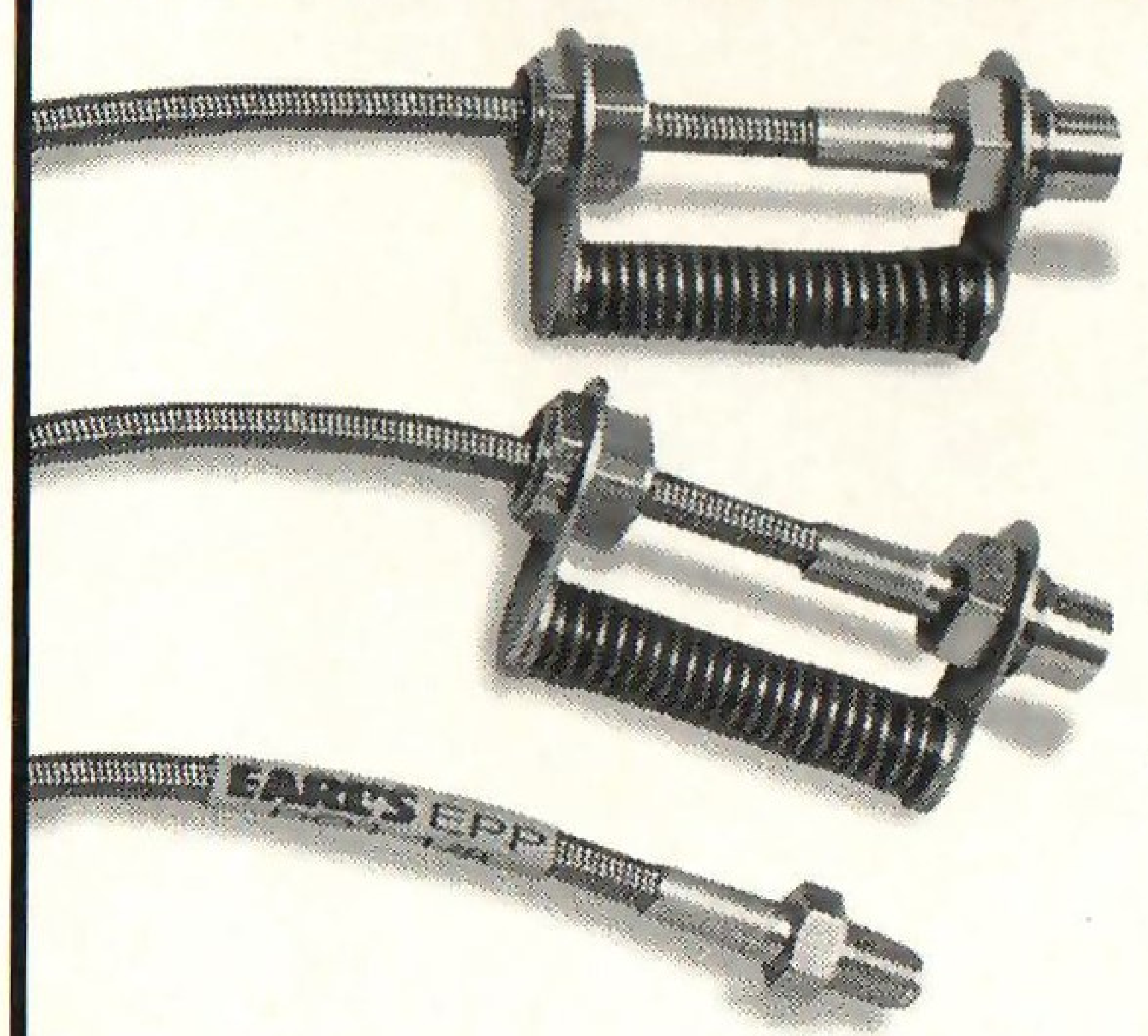


The Sidewinder is a revolutionary new street/strip muffler now available from Decker Engineering. The Sidewinder utilizes a unique spring-loaded dampener that is easily adjustable to sound level and backpressure, via the screw-in jam nut at the back of the muffler. The Sidewinder's tunable feature allows engine performance to be optimized for each individual application, and the Sidewinder's T-304 stainless steel construction ensures it will survive years of strip/street service. For additional information contact **Decker Engineering**, Inc., 4947 Marine Ave., Dept. PHR, Lawndale, CA 90260, (562) 973-2579.

NEW EARL'S "HYPER" STOPPING PRODUCTS

Reduce Your Stopping Distances an Average of 17 Feet from 80 MPH Just by Replacing Your Brake Hoses**

Hyperfirm® *Highway Legal*** *Brake Line Kit*



- *Firmer Pedal Feel*
- *Initial testing shows reduced stopping distances of up to 10% from 80 MPH***
- *Ready to Install*
- *More efficient use of hydraulic energy*
- *Complete vehicle set, includes front & rear Hyperfirm® brake lines*

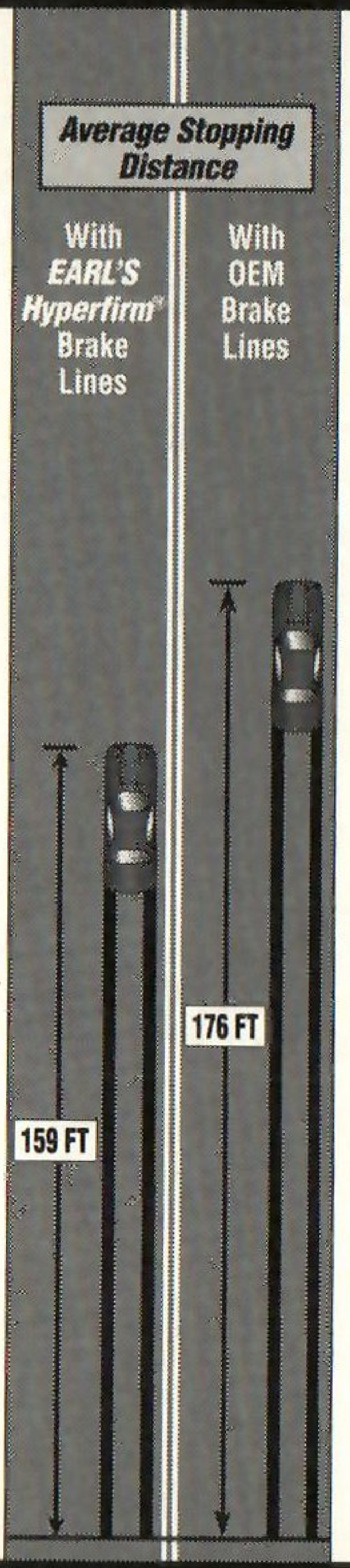
Works in conjunction with ABS brake systems and reduces or eliminates pulsations common to ABS systems.

EARL'S PERFORMANCE PRODUCTS

189 West Victoria St.
Long Beach, CA 90805
310 / 609-1602

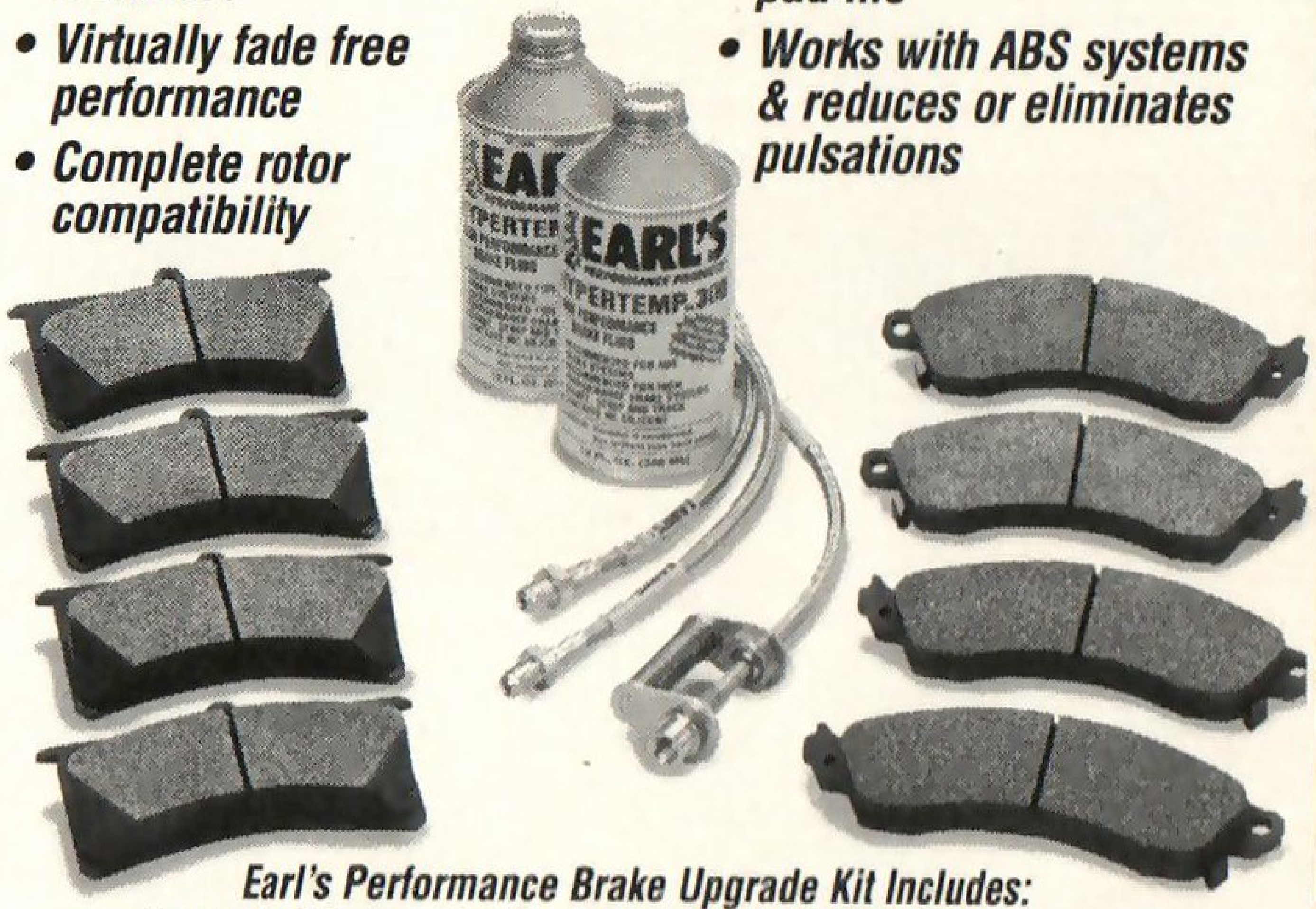
Illustration represents results of our initial comparison testing. Test vehicle was a 1993 Toyota Supra, equipped with anti-lock brakes. Professional drivers on a closed course. Since many variables may exist at the time of an emergency stop - no specific results are implied or guaranteed beyond the fact our tests demonstrated Hyperfirm® hoses reduce stopping distances when all other contributing factors are constant.

Average Stopping Distance



Performance Brake Upgrade Kit

- *Reduced stopping distances**
- *Virtually fade free performance*
- *Complete rotor compatibility*
- *Dramatically improved pad life*
- *Works with ABS systems & reduces or eliminates pulsations*



Earl's Performance Brake Upgrade Kit Includes:
Hypergrip® Carbon Metallic® Brake Pads • Vehicle set Hyperfirm® highway legal brake lines • Two 12 oz. cans Hypertemp® brake fluid
Available for most high performance applications.

The combination of our unique *Hypergrip®* brake compounds,* highway legal** Teflon® lined brake hoses and Hypertemp® brake fluid provides repeatable, predictable ultra braking performance with superior release characteristics for improved driver modulation and feel.

*Carbon Metallic Brake Pads, made for Earl's and tested by Performance Friction. Meets FMVS 105 & 106 standards. **As tested by Earl's.

If you're an enthusiast that demands ultra high performance braking, you need Earl's new Hyper Brake Products

---

Bad Boy Performance. Good Guy Prices.

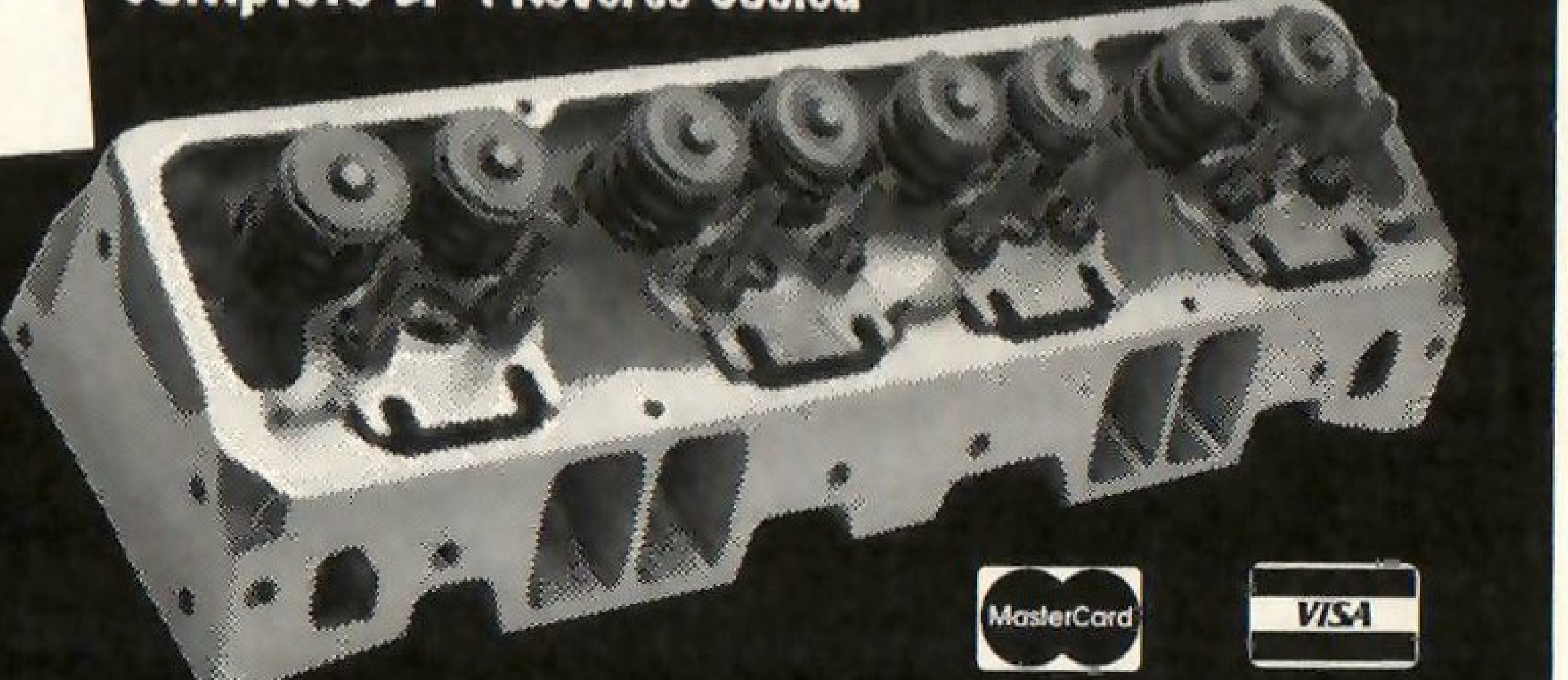
AFR CNC-PORTED HEADS BURN UP THE STREET.

Features to Compare	Air Flow	Brand "B"	Brand "E"	Brand "T"
Bronze Guides	YES	YES	YES	NO
1.450 Dbl. Hydraulic Springs with Damper	YES	NO	YES	NO
Non-Magnetic Stainless Steel Valves	YES	YES	YES	NO
10° Machined Retainers & Locks	YES	NO	NO	NO
100% CNC Ported Combustion Chambers & Exhaust Ports	YES	NO	NO	NO
3/4" Decks for Nitrous or Blown Engines	YES	NO	NO	NO
CNC Ported Intake Bowls Gasket Matched	YES	NO	NO	NO

MORE GOOD STUFF:
• Ductile seats for unleaded gas • Unique water jacket for thermal efficiency • Competition valve job • Avail. for tall port or stock manifolds • Center-bolt valve covers too • Straight or angled plug versions • Drilled for accessories • Completely assembled.

Feature for feature, AFR CNC-ported street heads are the best performance value around. Our heads make 80 HORSEPOWER OVER FACTORY ALUMINUM HEADS. That's real-life, repeatable horsepower. On pump gas. Plus, AFR serves up cylinder heads "your way." Sure, we offer heads in 3 stages of prep, but just ask us and we'll customize any package "your way." Remember too, we'll upgrade any AFR heads, anytime you're ready and you'll get the job right, first time, everytime. Who else does all this?

$889/pair Bare with Valve Job
$1200*/pair Complete *'86 & earlier
$1695/pair Complete LT-1 Reverse Cooled
C.A.R.B. EO#250-02



MasterCard VISA

AIR FLOW RESEARCH • 10490 ILEX , PACOIMA, CA 91331 • TEL 818-890-0616 • FAX 818-890-0490

Headers come painted black.

Summit Blockhugger Headers for Small Chevy

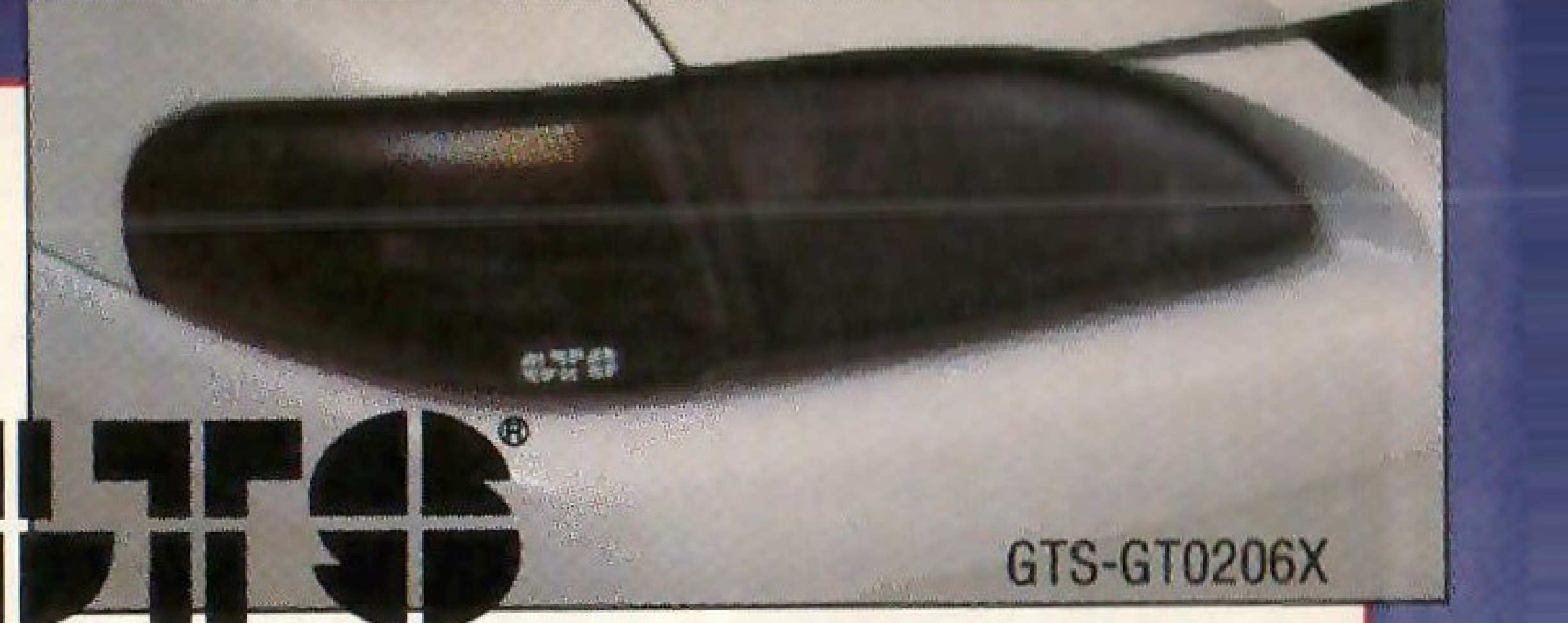
Ideal for tight-fitting engine compartments and street rods. 1½" primary tubes, 5/16" flanges for better sealing. Bolts, gaskets, and reducers included. Fits 1955-93 small Chevy.

SUM-G9060	Black painted	**$60.69**

Auto Custom Carpets

Redo your interior with carpet that matches OEM color and material. Available for American vehicles from the 1950s to today, the carpets are heat molded to original specs to fit perfectly. Sound deadening material and felt underlay included. Call for available applications.

From	**$94.99**



GTS-GT0206X

GTS Carbon Fiber Style Headlight and Tail Light Covers

Get that high-tech carbon fiber look at an affordable price! These GTS headlight covers and Blackout tail light covers install quickly with no drilling. Available for most popular late model cars and trucks—call for applications. Check local laws before ordering.

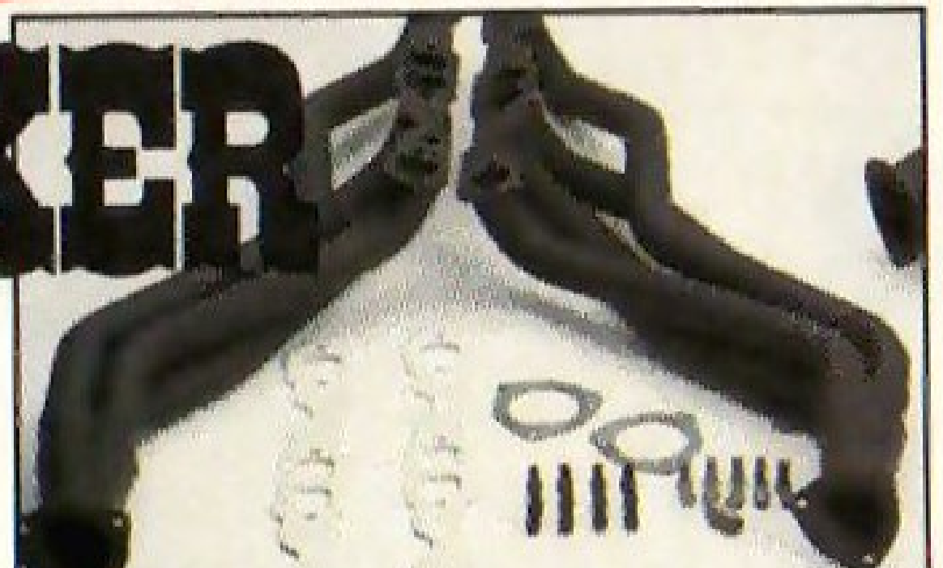
Headlight Covers	from **$36.95**
Blackout Tail Light Covers	from **$36.95**

TOLL-FREE HORSEPOWER

Low Prices, Free Shipping, & Fast Service! CALL SUMMIT!

EXHAUST

HOOKER



Hooker Competition and Super Competition Headers

Please specify make, model, year and engine when ordering

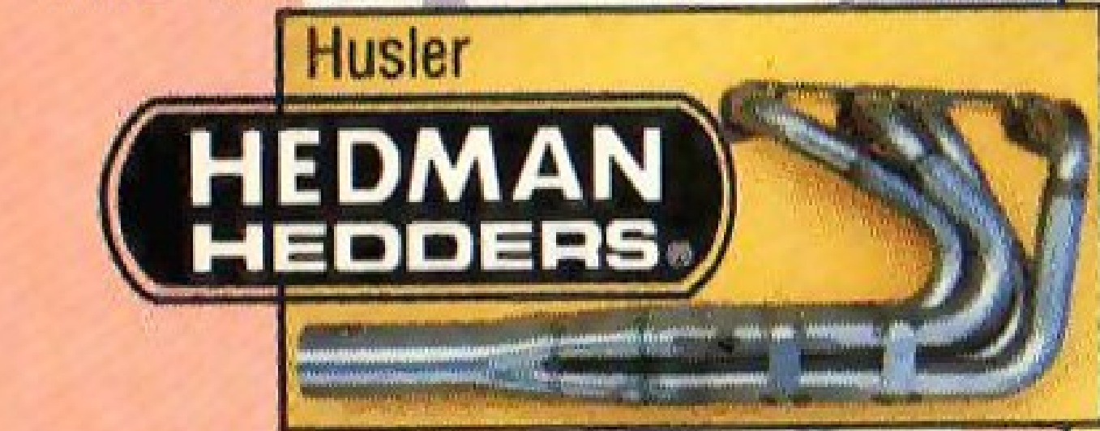
Competition Headers	Most V8	**$117.95**
Super Competition Headers	Most V8	**$252.95**

Walker Dynomax Headers

- Computer bent and leak tested
- Machine formed/hand welded primary tube ends
- Die-cut exhaust port flanges,O-ring ports

DYNOMAX Performance Exhaust

Standard Painted Headers	
Most V8 applications	**$86.69**
Ceramic-Coated Headers	
Most V8 applications	**$199.69**



Husler

Standard

HEDMAN HEDDERS

Hedman Standard and Husler Hedders

Standard Street, most V8s	**$92.95**
Husler Street/Strip	Starting at **$149.99**

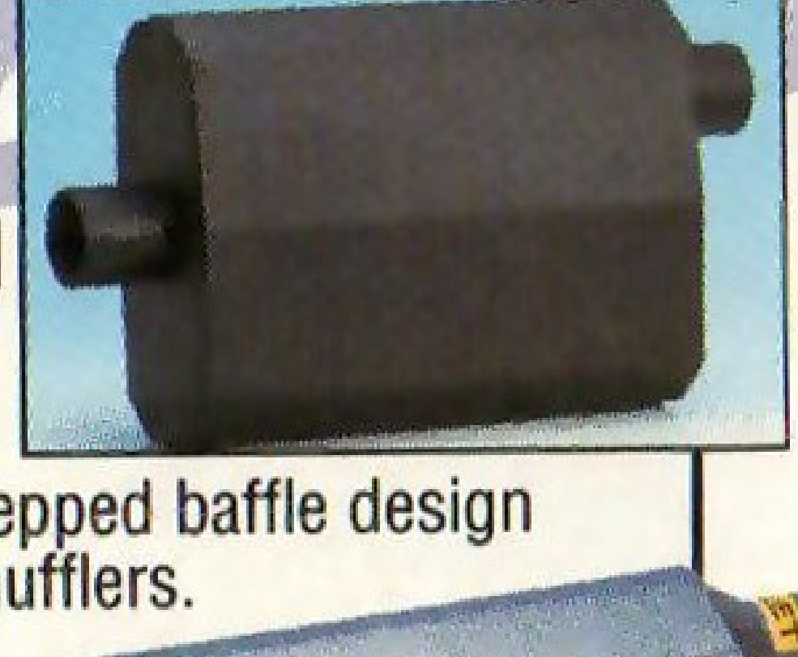
Percy's Seal-4-Good Aluminum Collector Gaskets

Aluminum gaskets are blowproof and resusable. Sold individually.

PHP-66001	2½"	**$14.95**
PHP-66002	3"	**$14.95**
PHP-66003	3½"	**$14.95**

Hooker Max Flow and Aero Chamber Mufflers

HOOKER



Max Flow mufflers have straight-through design that increases torque over 2½" open pipe. Aero Chamber mufflers have stepped baffle design that flows 81 cfm more than other hi-po mufflers.

Max Flow Mufflers	from **$50.95**
Aero Chamber Mufflers	from **$50.95**

Flowmaster Mufflers

Two Chamber		
FLO-42540	2.5" center inlet/outlet	**$50.95**
FLO-42542	2.5" center inlet/offset outlet	**$50.95**
FLO-43040	3" center inlet/outlet	**$50.95**
Three Chamber		
FLO-42451	2.25" offset inlet/center outlet	**$53.95**
FLO-42551	2.5" offset inlet/center outlet	**$53.95**
FLO-42553	2.25" offset inlet/outlet	**$53.95**
FLO-43051	3" offset inlet/center outlet	**$53.95**
Universal Turbo Style		
FLO-42541	2.5" offset inlet/center outlet	**$50.95**

Thrush California Boss Turbo Mufflers

30% more flow than stock. Reversible mufflers have double galvanized case for long life. Size: 4¼" x 8³⁄₁₆" x 18½".

WLK-17711	2" offset inlet, center outlet	**$16.50**
WLK-17713	2¼" offset inlet/outlet	**$16.50**
WLK-17715	2½" offset inlet, center outlet	**$16.50**

Summit Turbo Mufflers

Free-flowing American made aluminized mufflers with double wrapped case.

From	**$14.75**

AIR & FUEL

Edelbrock

Edelbrock Torker II®

Small Chevy	**$92.25**
Big Chevy	**$166.95**
Small Ford	**$152.50**
Small Chrys.	**$162.75**
Pontiac	**$166.95**

Edelbrock RPM Manifolds

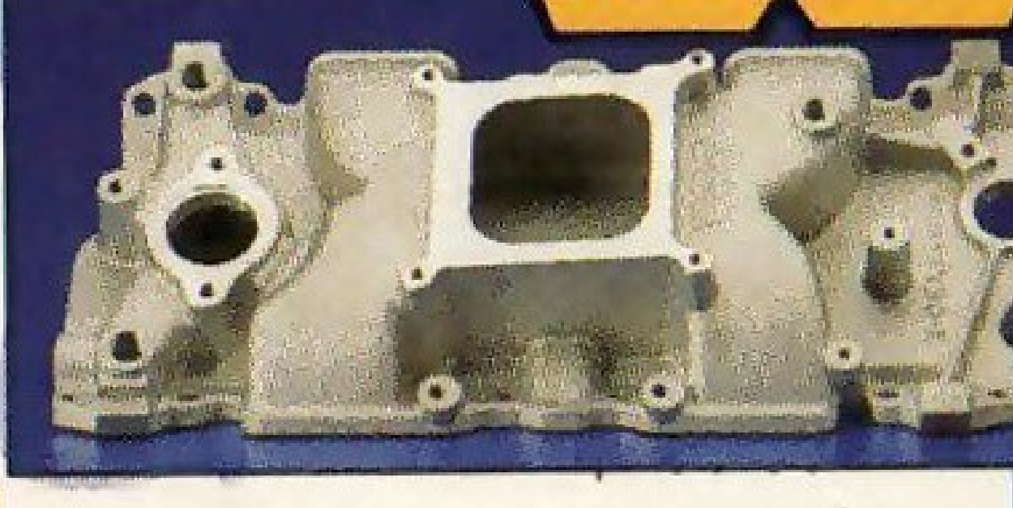
EDL-7101	Small Chevy, non-EGR	**$115.95**
EDL-7161	Big Chevy oval port, non-EGR	**$169.95**
EDL-7121	Ford 289-302, non-EGR	**$142.95**

Edelbrock Performer™ Manifold and Performer Plus Camshaft Package

Camshaft Package	**Manifold**	**Cam Kit**
Chevy 283-327-350	**$102.25**	**$109.95**
Chevy 396-427-454	**$147.25**	**$109.50**
Chrysler 318-340-360	**$154.75**	**$118.95**
Chrysler 413-426-440	**$153.75**	**$143.95**
Ford 289-302	**$125.95**	**$115.95**
Ford 351W (Not Boss)	**$150.95**	**$118.95**
Ford 351M-400	**$163.25**	**$118.95**
Pontiac	**$152.95**	**$121.95**
AMC 304-360-401	**$163.50**	**$113.95**
Ford 429/460 (Not CJ)	**$161.50**	**$116.95**
Ford 332-428	**$212.25**	**$120.95**
Olds 1975 & Later 330-403	**$169.50**	**$125.95**

Cam Kit Includes cam, lifters, and lube.

WEIAND



Weiand Action Series Manifolds

Dual plane manifolds, non-EGR

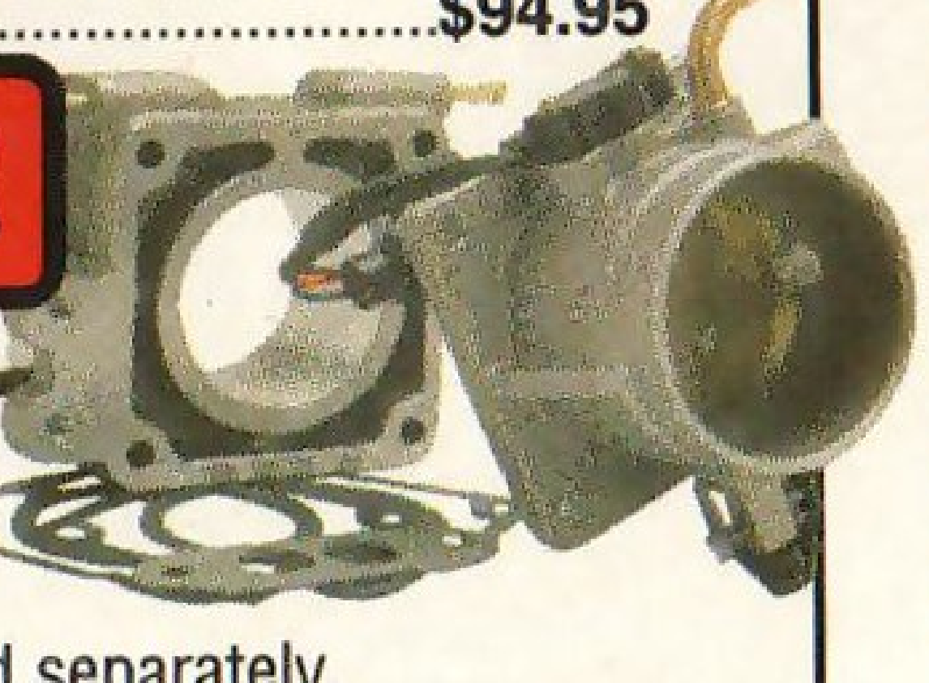
Small Chevy	**$84.95**
Big Chevy oval	**$144.95**
289-302 Ford	**$104.95**
351M-400 2V	**$157.50**
Small Chrysler	**$150.95**

Weiand Stealth Intake Manifold

Dual plane, wide powerband ideal for oval track racing. For small Chevy

WND-8016	**$94.95**

Edelbrock



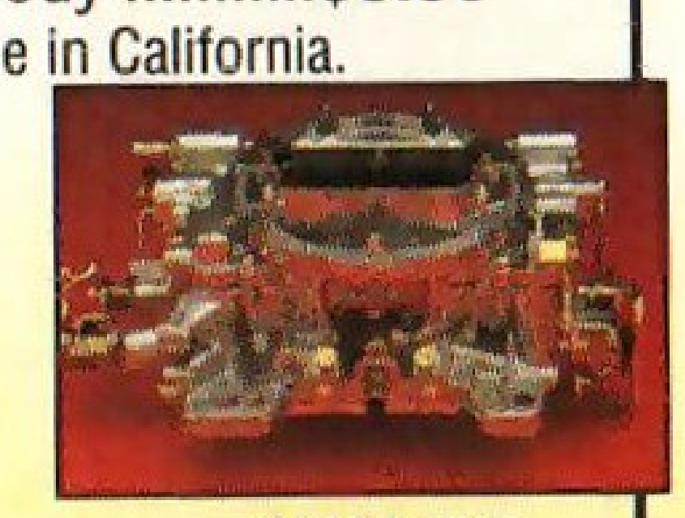
Edelbrock Throttle Bodies and EGR Plate for 5.0L Ford

Edelbrock's high-flowing 70mm throttle body is designed for use with the Performer 5.0L manifold. The throttle body is 50-state-legal and comes with gaskets. EGR plate sold separately.

EDL-3825*	70mm throttle body	**$191.95**
EDL-3828*	70mm EGR plate	**$59.39**
EDL-3824*	65mm throttle body	**$184.95**
EDL-3826*	75mm throttle body	**$198.95**
EDL-3827*	65mm EGR plate	**$51.69**
EDL-3830	Replacement gasket for throttle body	**$8.50**

*This item carries CARB E.O. number D-215-11 for use in California.

Edelbrock

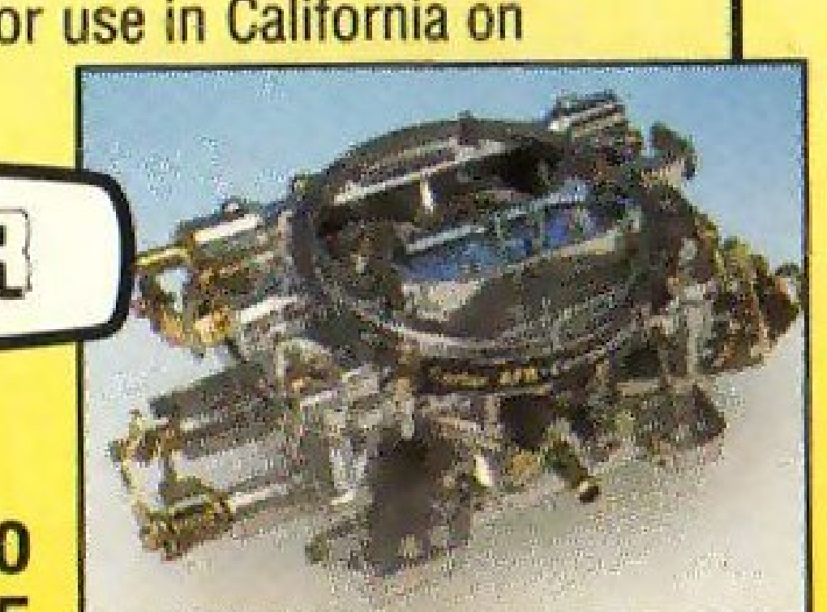


Edelbrock Performer Series Carburetors

EDL-1404	500 cfm, manual choke	**$201.95**
EDL-1405	600 cfm, manual choke	**$195.50**
EDL-1406	600 cfm, electric choke	**$222.75**
EDL-1400*	600 cfm, electric choke and EGR port	**$249.95**
EDL-1409	600 cfm, marine version	**$287.95**
EDL-1407	750 cfm, manual choke	**$204.50**

*EDL-1400 carries CARB E.O. number D-215-10 for use in California on 1980 and earlier small block Chevy.

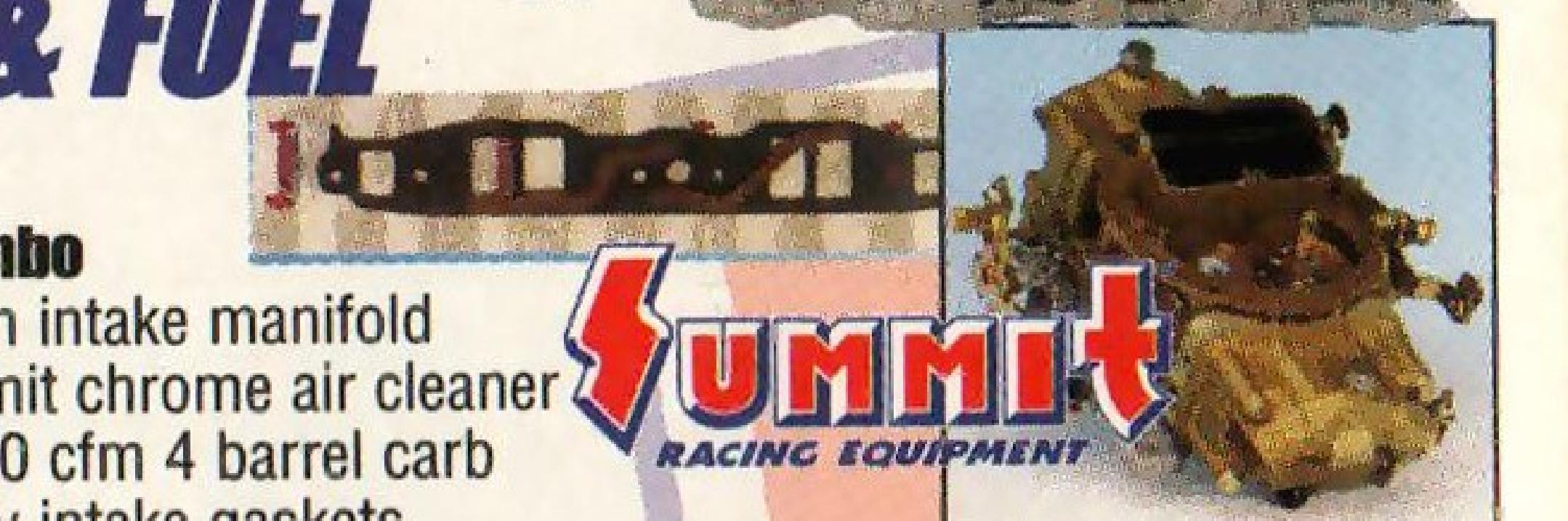
CARTER



Carter Carburetors

Manual Choke	
600 cfm, Chevy	**$171.95**
750 cfm, Chevy	**$182.95**
Electric Choke	
625 cfm, Chevy	**$224.50**
625 cfm, Chrysler	**$232.95**
625 cfm, Ford	**$229.95**

AIR & FUEL



Summit Intake Combo

- Aluminum intake manifold
- 14" Summit chrome air cleaner
- Holley 600 cfm 4 barrel carb
- Necessary intake gaskets

Select the manifold manufacturer of your choice:

	WEIAND	**OFFY**	**HOLLEY**	**EDELBROCK**
Sm. Chevy 283-400	**$285.95**	**$336.95**	**$289.95**	**$294.95**
Sm. Ford 289-302	**$292.95**	**$339.95**	—	**$315.95**
Ford 351C 2 bbl.	**$371.95**	—	—	—
Ford 351C 4 bbl.	—	**$359.95**	—	**$345.95**
Ford 351M-400M	**$341.95**	—	—	**$347.95**
Ford 351W	—	**$359.95**	—	**$334.95**
Sm. Chrys. 273-360	**$349.95**	**$374.95**	—	**$338.95**
Pontiac 350-455	**$365.95**	**$372.95**	—	**$343.95**

Combo not available for Ford with automatic transmission.
HOLLEY 600 CFM Vacuum Secondaries Standard
HOLLEY 750 CFM Vacuum Secondaries - $20.00 Extra

ENGINE

Trick Flow® Serious Horsepower

Trick Flow® Twisted Wedge® R-Series Heads for 302-5.0L-351W Ford

The R-Series heads provide 305 cfm intake and 225 cfm exhaust airflow at .700" of valve lift—right out of the box. The head features exclusive 61cc Twisted Wedge combustion chamber, 206cc intake ports, exhaust ports raised .500" from stock for better flow, 2.08" intake/ 1.60" exhaust valves. Additional material for porting, optional machining for Fel-Pro Loc-Wire® head gaskets. Set up for stud mount rocker arms, machined for 1.550" valve springs. Bronze valve guides. Available as bare castings, 5/16" guideplates included. Sold in pairs.

TFS-52400001	O-ring, with seats and guides	**$1,289.00**
TFS-52400002	Non-O-ring, with seats and guides	**$1,239.00**
TFS-524B0001	O-ring, without seats and guides	**$1,129.00**
TFS-524B0002	Non-O-ring, w/out seats and guides	**$1,089.00**

Trick Flow® Serious Horsepower

Trick Flow® Twisted Wedge® Aluminum Cylinder Heads for Small Block Ford

These heads made 78 more horsepower and 54 ft.-lbs. more torque than stock heads on a 5.0L Cobra engine! Fully assembled heads have stock height intake and exhaust ports. 50-state-legal (CARB E.O. D-369-1) for 1996-earlier 289, 302, 5.0,351W. Heads also available with machined grooves for Fel-Pro Loc-Wire gaskets. Sold in pairs.

TFS-51400001	Heads for pedestal mount rockers	**$909.00**
TFS-51400002	Heads for stud mount rockers	**$899.00**
TFS-51400003	Heads for stud mount rockers w/O-ring groove	**$949.00**

Trick Flow® Serious Horsepower

Trick Flow® Twisted Wedge® Aluminum Heads for Small Chevy

Assembled heads have patent-pending 64cc combustion chambers, high velocity intake ports, 2.02/1.6 stainless valves, 1.25" springs, retainers, locks, screw-in studs, and guideplates. Heads accept stock manifolds and accessories, aftermarket manifolds and headers. **Trick Flow Twisted Wedge Heads carry CARB E.O. number D-369 for use in California.**

TFS-31400001	Pre-1987 327-350-400	**$899.00**
TFS-31400002	1987-up 350	**$899.00**
TFS-31400003	1986-up Corvette	**$899.00**

SOME PARTS ARE NOT LEGAL FOR SALE OR USE IN CALIFORNIA ON ANY POLLUTION CONTROLLED MOTOR VEHICLES

SplitFire Spark Plugs and Ignition Wire
Standard SplitFire Plugs
Patented V-shaped electrode exposes more of center electrode for more complete air/fuel charge burning, boosting power and mileage.
Most applications ....each **$5.95**
Platinum SplitFire Plugs
Same V-shaped electrode as regular SplitFire plugs, but with platinum-plated tips for ultra-long life. Limited lifetime replacement warranty.
Most applications ....each **$9.95**
SplitFire Twin Core Ignition Wire
Dual Firing Path™ uses two wires to reduce resistance by 92% over carbon core wires. Stainless steel windings insure maximum voltage. Kevlar reinforced fiberglass core, silicone outer jacket, stainless steel springs and clips. Limited lifetime warranty.
Most V8 engines **$59.99**

OPTIMA® Batteries
Unique Spiral Cell® construction makes a durable battery that cranks out the amps, even at the track. The zero-maintenance OPTIMA puts out 800 cold-crank amps, can be mounted in any position, and is 100% sealed. 120 minute reserve capacity.
ULT-8082-002 Top posts, 9¹⁵⁄₁₆" x 6⅞" x 7¹³⁄₁₆" **$139.99**
ULT-8084-003 Top and side posts, 9¹⁵⁄₁₆" x 6¾" x 7¹³⁄₁₆" ; **$139.99**

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SUBSCRIBE TO THE WORLD'S MOST POPULAR PERFORMANCE CATALOG!

3 BIG ISSUES! $5.00

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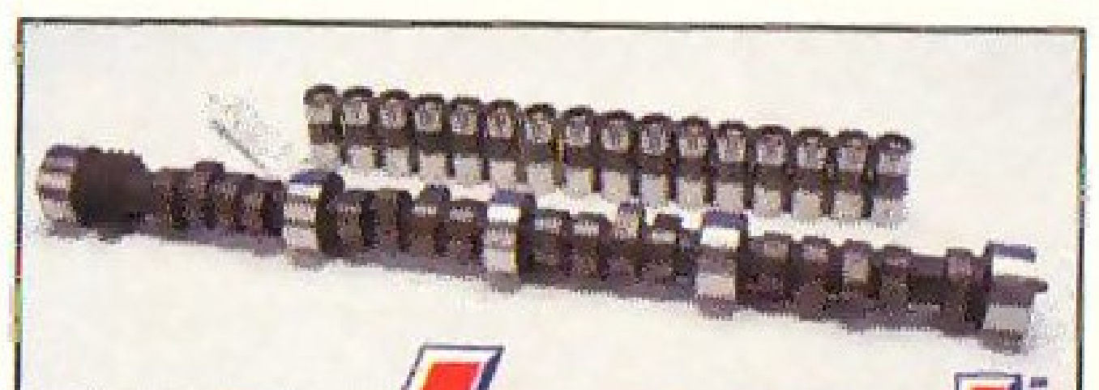

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SUM-K1105	282	292	465	488	**$79.95**
SUM-K1106	292	292	488	488	**$79.95**
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SUM-K3600	262	272	448	472	**$82.95**
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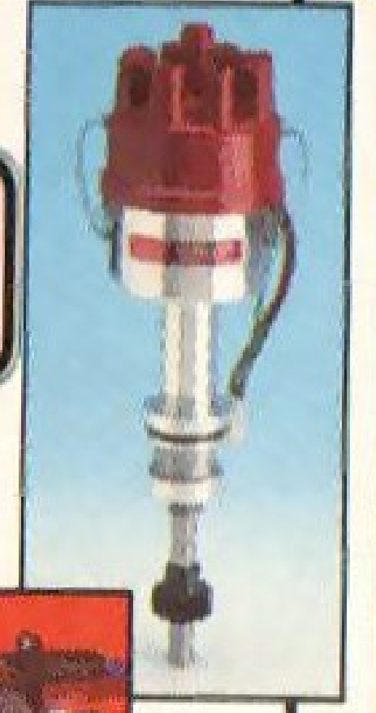

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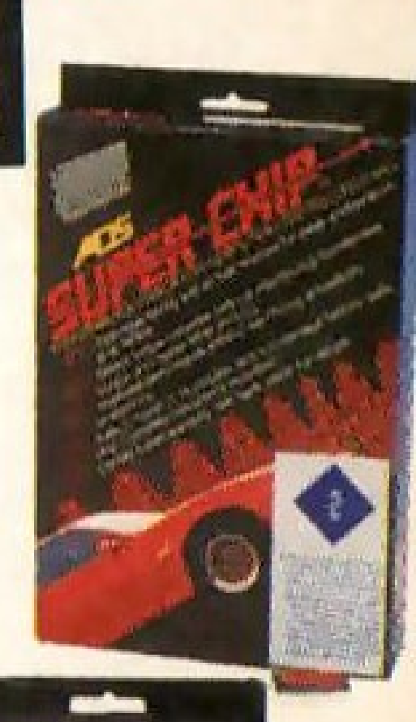

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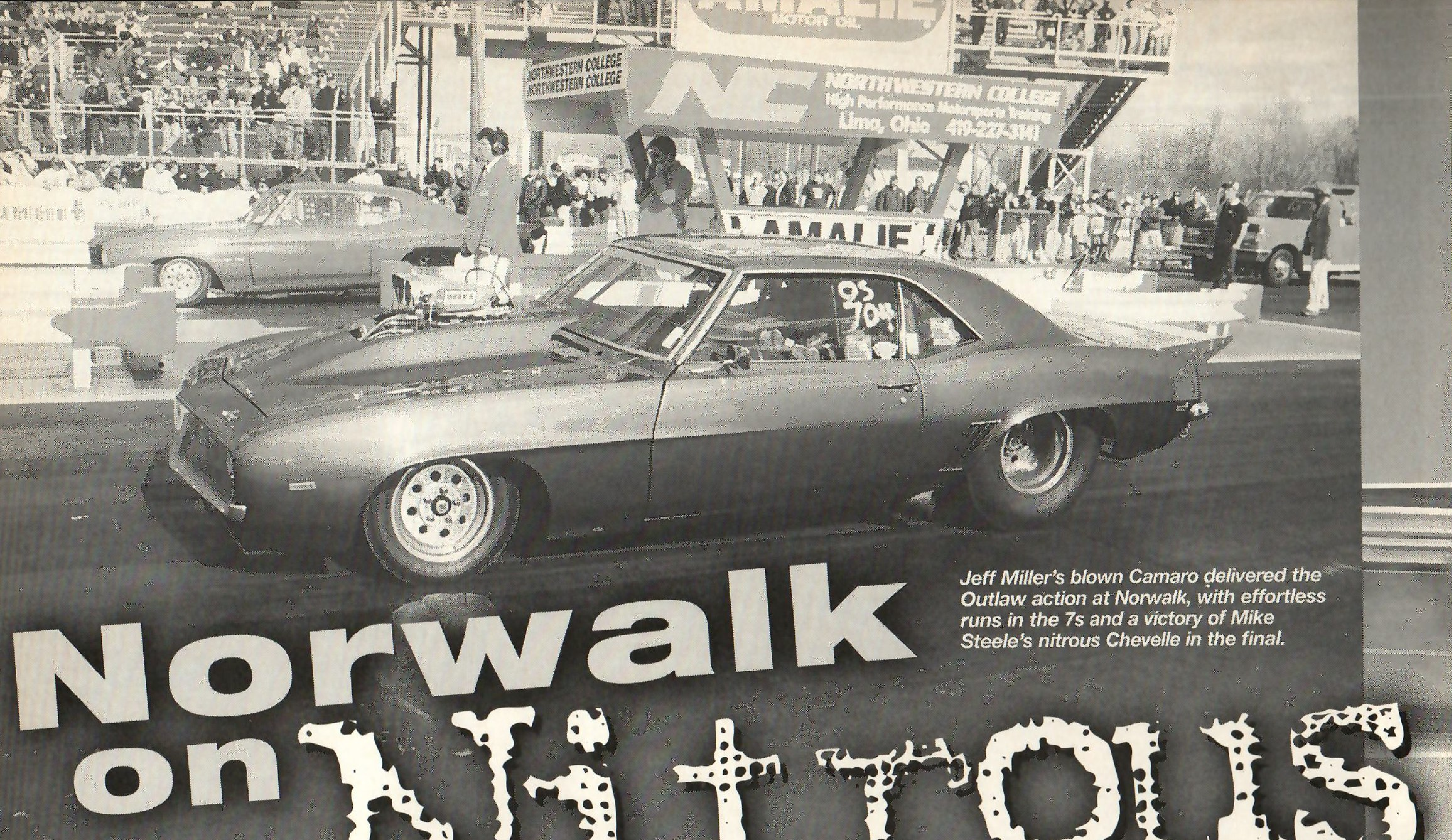


Jeff Miller's blown Camaro delivered the Outlaw action at Norwalk, with effortless runs in the 7s and a victory of Mike Steele's nitrous Chevelle in the final.

Norwalk on Nitrous

BY CAMERON EVANS

Powered by a stock 440 with a single nitrous plate, no one can miss Jeff McKernan's green '70 Dart. We saw him run 10s at Memphis last year, but his luck at Norwalk wasn't so good.

"It wouldn't be a drag race without rain."

True drag fans have heard experienced veterans mutter that phrase over the years, and it's been that kind of season on the National Muscle Car Association tour. Compared with St. Louis, where we practically lost the Saturday night qualifying session to snow, the second stop in Norwalk, Ohio, was an exciting (and hurried) event. Warmer, too.

As rain cancelled Saturday's activities at Norwalk, the NMCA Flowmaster Fastest Street Car racers were forced to strut their stuff with only one qualifying session and very little time trial opportunities. Hey, these guys are the best in the world at street-legal drag racing, so who needs practice anyway!

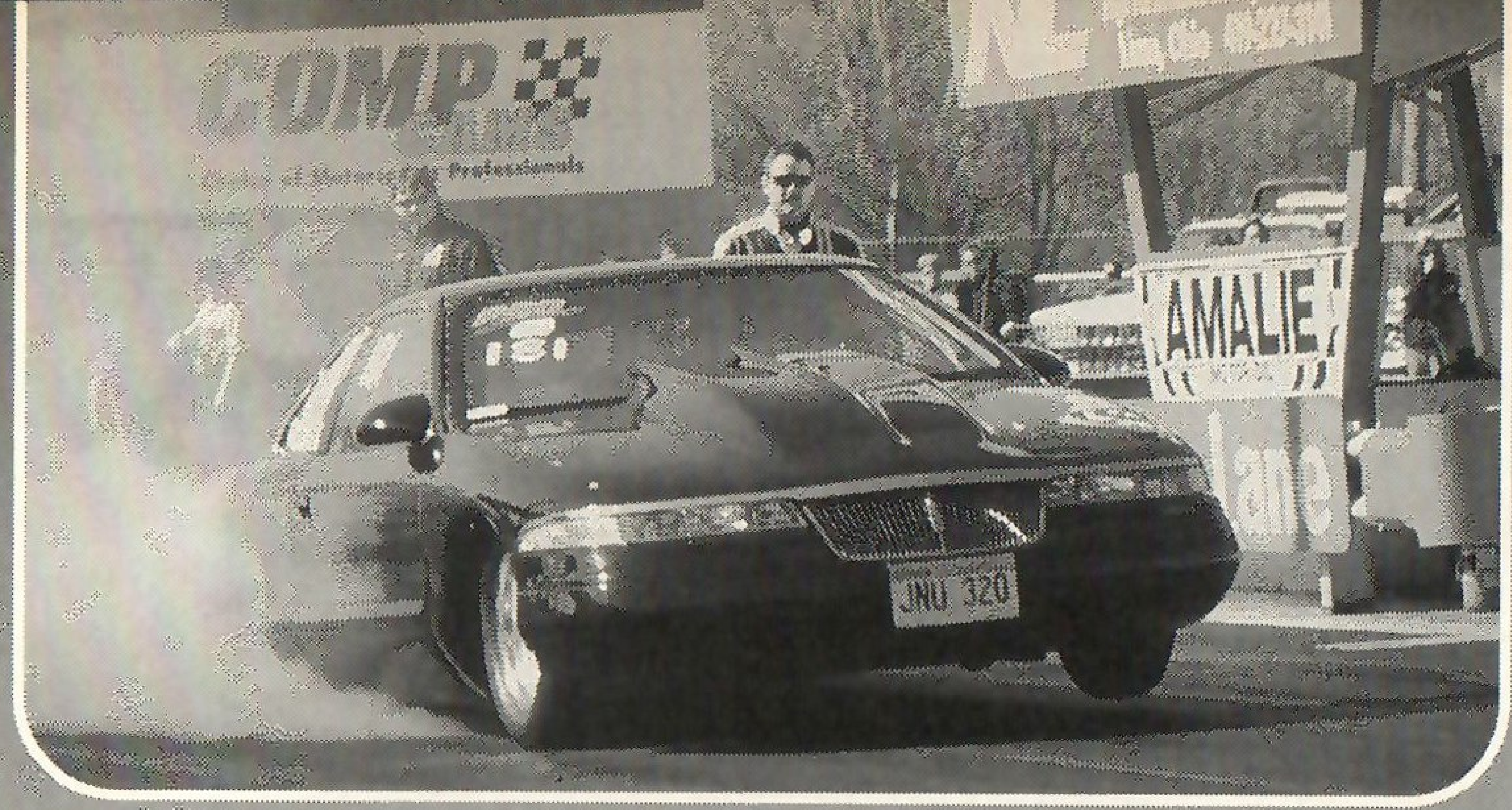
Racers love coming to Norwalk, as pits are clean and the track is quick, both depending on how much rain either see in the days prior to an event. Bill Bader debuted his spectacular new grandstand which had racers and fans climbing its lofty heights for an interesting perspective on NMCA drag racing.

A MUSI STRANGLEHOLD

The Pro Street field showed some new entries and a few familiar faces from the past, including Rob Walden's all-new '97 Camaro SS (painted brightly in Hugger Orange) and Mark Tate's '67 Camaro (with a Powerglide instead of Lencos). As for the standard hitters, only Pat Musi and Animal Jim Feurer made the Ohio trip, as Mike Moran was still licking his wounds over the St. Louis headlight debacle and Tony Christian either had trailer problems or his new, late-model Camaro is taking longer to build than he first imagined.

NMCA Flowmaster FASTEST STREET CAR SHOOTOUT
Presented by *Popular Hot Rodding*
Round Two: Norwalk, Ohio

Regardless, the sole qualifying session showed Steve Carrier's gorgeous '67 Nova at the top with a 7.40 and Walden's SS in solid (for a first time effort) with a 7.46. Eliminations were another story, as Musi showed his hand with an impressive first round 7.18 (and a shut-off-early speed of 168mph). No one ran within two-tenths of Musi's performance throughout the day,



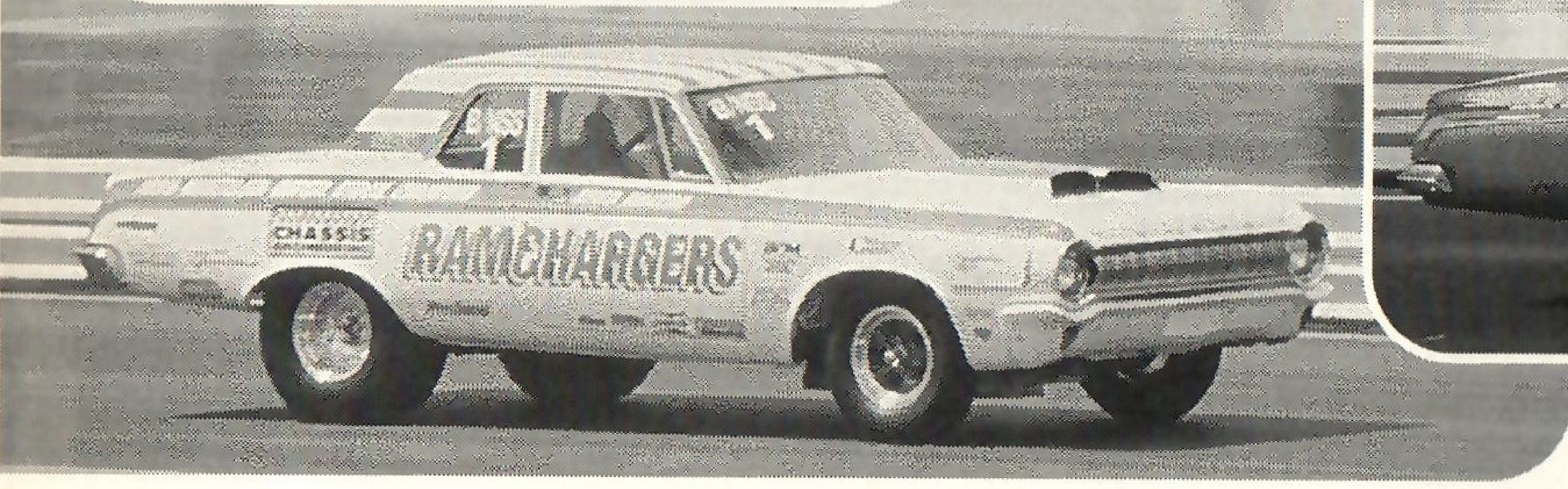
"Animal Jim" Feurer had the scooped hood fly off the hot rod Lincoln at the first NMCA event in St. Louis, so he came to Norwalk's round two with a cowl-induction hood. It didn't matter much, as that smoke you see on the first qualifying lap isn't from the tires!

NMCA guys are notoriously hard on parts, as witnessed by the smoking 302 in Karl Owens' Mustang. Karl runs 12s in the EFI class, but this mishap slowed him to a 13.50 and a first round loss.

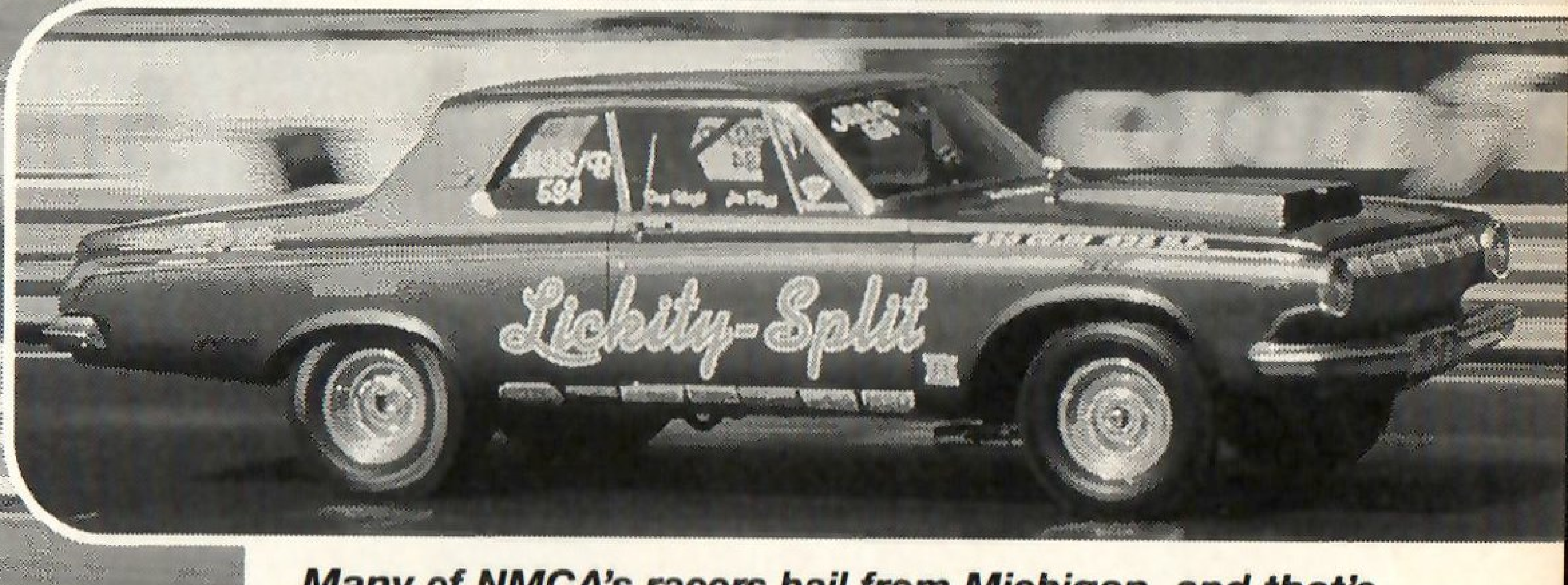
Gary Rohe is amazing the crowds and competitors with his absolute dominance of the EZ Street class with his 357-inch Mustang. He has run effortless mid-9s to win both NMCA events this season.

FINAL ROUND WRAP-UP

	STREET ET		
Win	Maurice Edwards, Norwalk, OH, '97 Ford Ranger	19.49	68mph
R/U	Maurice Edwards, Jr., Norwalk, OH, '97 Z/28	14.34	82mph
	FACTORY STOCK		
Win	Randy Rigatti, McMurray, PA, '69 Road Runner	12.47	108mph
R/U	Jeff Peterson, Ft. Worth, TX, '63 Sport Fury	12.45	112mph
	TOP STOCK		
Win	Charlie Booze, Jr., Marion, PA, '71 Torino	11.43	112mph
R/U	Rick Bess, Ona, WV, '70 Torino	11.81	115mph
	K&N EFI		
Win	John Shepard, Canton, OH, '92 Eagle Talon	12.39	109mph
R/U	Barry Shepard, Inkster, MI, '96 Mustang	13.19	102mph
	WINNEBAGO NOSTALGIA SUPER STOCK		
Win	Doug Duell, Newburh, IN, '64 Fury	10.53	127mph
R/U	Doug Barker, Gregory, MI, '65 Belvedere	9.94	133mph
	CHASSIS ENGINEERING PRO NOSTALGIA		
Win	Paul Adams, Harboursville, WV, '66 Fairlane	9.76	132mph
R/U	Jim Mackenzie, Elkton, MD, '62 Biscayne	9.98	133mph
	HOLLEY ANNIHILATOR IGNITION SYSTEMS EZ STREET		
Win	Gary Rohe, Lawrenceburg, IN, '80 Mustang	9.75	124mph
R/U	Mark Mancini, Corpus Corpus, TX, '63 Savoy	10.02	132mph
	EDELBROCK LIMITED STREET		
Win	Alan Witten, Fredericksburg, VA, '87 T-Type	9.28	147mph
R/U	Pete Misinsky, Jr., Tuckerton, NJ, '90 Mustang LX	broke	
	MICKEY THOMPSON SUPER STREET		
Win	Nick Gaglione, Jr. Ft. Lauderdale, VA, '80 Corvette	8.32	162mph
R/U	Donny Bray, Bowling Green, KY, '94 Camaro	8.61	158mph
	SUNOCO MODIFIED STREET		
Win	Scott Merkel, Northport, NY, '70 Camaro	8.40	162mph
R/U	Randy Eakins, Sikeston, MO, '89 Corvette	8.58	166mph
	NITROUS EXPRESS OUTLAW STREET		
Win	Jeff Miller, Midland, VA, '69 Camaro	7.85	159mph
R/U	Mike Steele, Shreveport, LA, '72 Chevelle	8.30	163mph
	COMPETITION CAMS PRO STREET		
Win	Pat Musi, Carteret, NJ, '69 Camaro	8.17	155mph



Though brother Mark was able to get to the EZ Street final with his '63 Plymouth Savoy, Greg Mancini wasn't so lucky. Greg did run 10s all day, but lost in the third round of Nostalgia Super Stock in his famed Ramchargers Dodge.



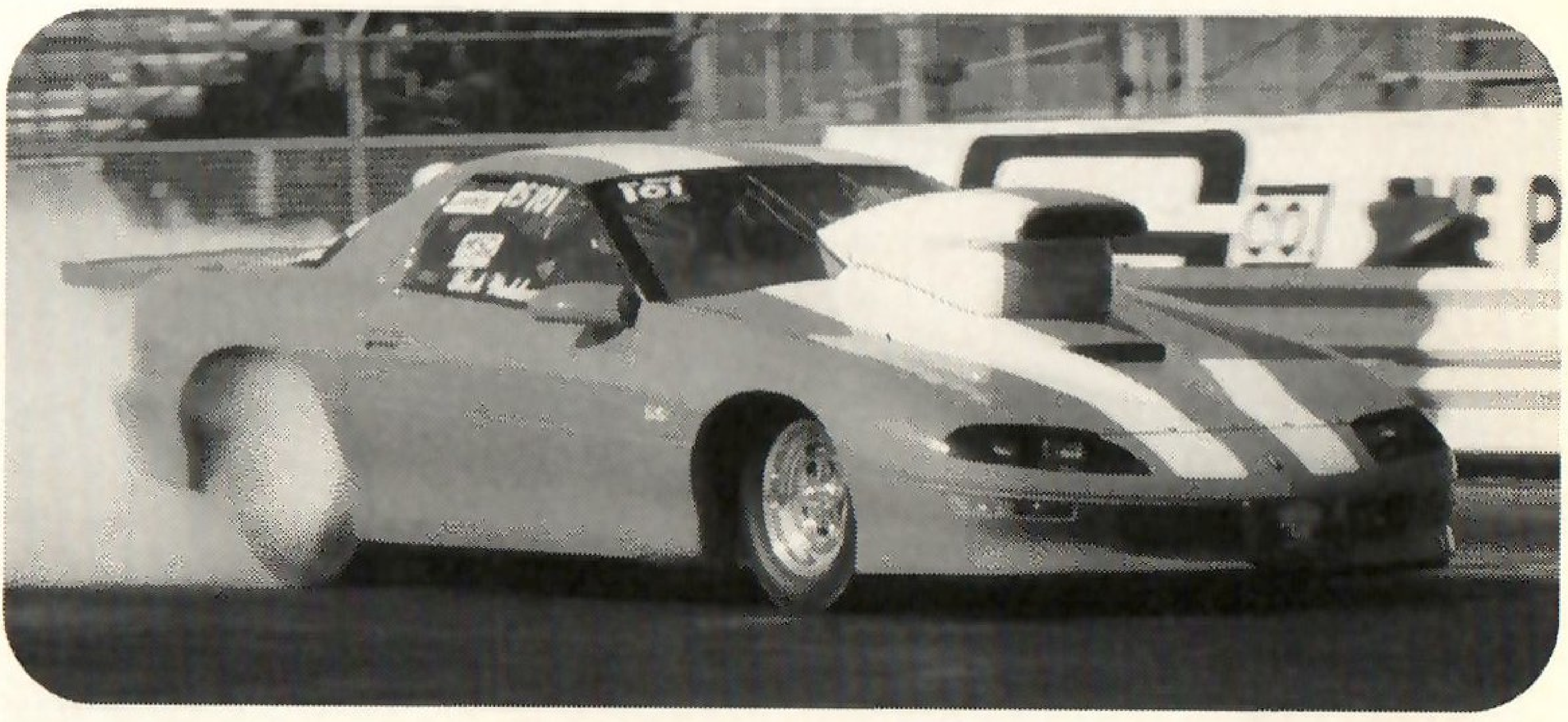
Many of NMCA's racers hail from Michigan, and that's especially true for the Nostalgia Super Stock class. Doug Wright came down to Ohio from Waterford with his '63 Polara and went two rounds. Had fun, too.

and given that both Tate and Walden failed to show for their semi-final match up, Musi singled in the final to a giant points lead in the Pro Street championship.

FIELDS WERE FULL

Plenty of contestants showed for NMCA's other popular classes, including a good group of blown cars in the new Outlaw Street class and lane full of EZ Street cars with street tires, iron heads, and bolt-on suspension only.

Though the Super Street racer's complaints are rapidly increasing over Chuck Samuel's success with the new FP



Rob Walden didn't debut his great-looking Camaro SS with headlight covers, so he got through tech without trouble. Running a 7.46 off the trailer, look for him to go rounds at races later this season.

electronic fuel injection and a sheetmetal manifold (for which there is currently no weight penalty), a nearly half-second performance advantage doesn't always win races. This was proven by Nick Gaglione's consistent laps in the mid-8s, which helped him take the Super Street victory with his SB-2 small block-powered Corvette.

A BUSY SUMMER

As the NMCA tour carries on, look for the points battles to heat up. The first event in St. Louis counted for double points, and this Norwalk event featured a few repeat winners from the preceding event. Though the Atlanta, Ricmond, and Maple Grove races count as single races in the championship battle, title races will be carried into the late August event in Union Grove, Wisconsin, and onto the September finals in Memphis (with the exception of the Musi-dominated Pro Street class).

Keep up with it all here in *PHR* as the nitrous wars continue.

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The Outlaw Street class, an unlimited "catch-all" program for DOT-tire cars, gives the street rod guys a place to race. Ross Stomp (great name for a drag racer, huh?) brought his '41 Willys to Norwalk for a little stomping of his own, but he came up just short of Mike Steele's 8.06 with a 8.17 in his first round loss.

Put 632 cubic inches and giant tires into your back-halved '84 Monte Carlo SS and you'll launch like this too. Brentwood, New York's Jack Boer powered his way to the Modified Street semi-finals at Norwalk, running an 8.83 along the way.

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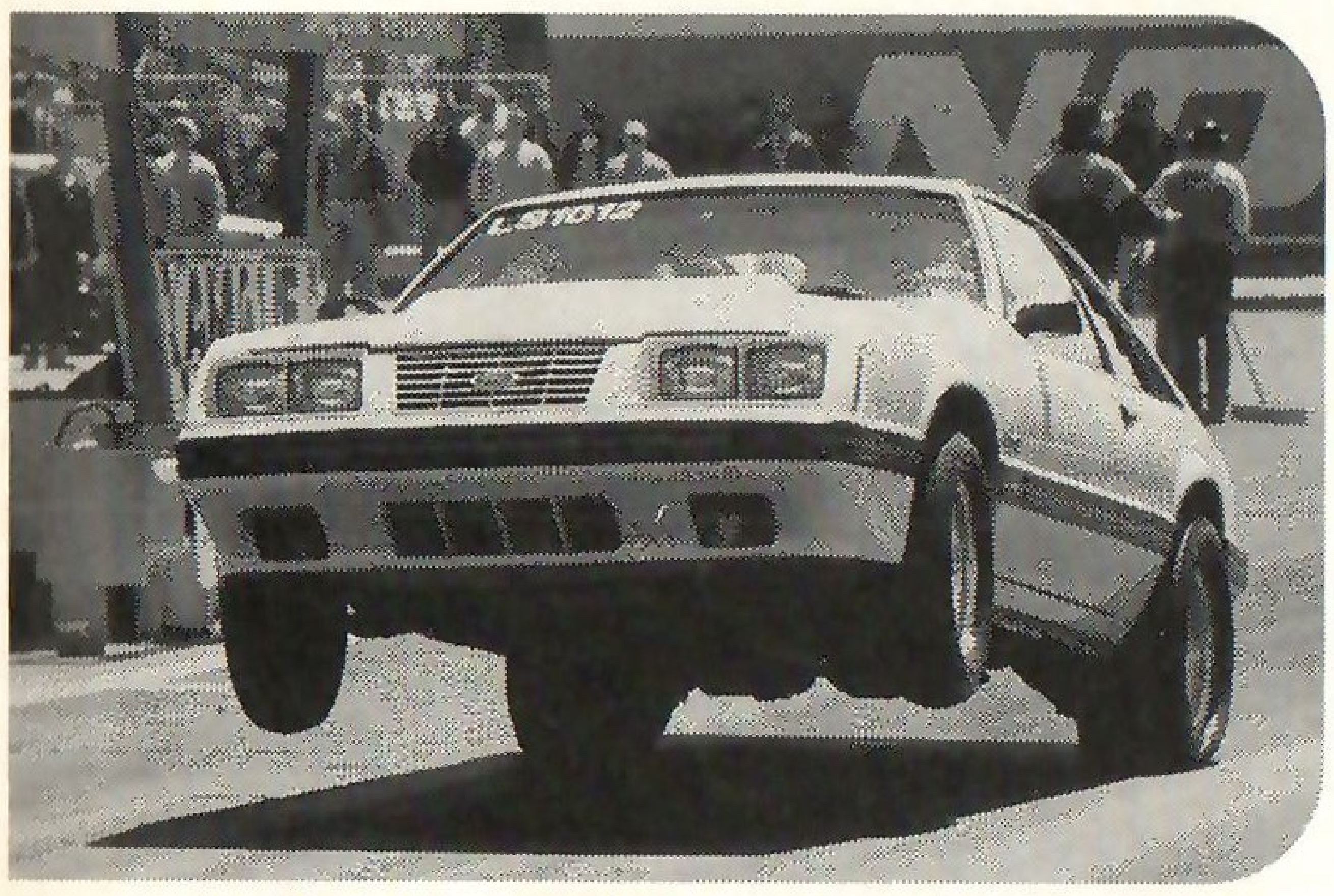
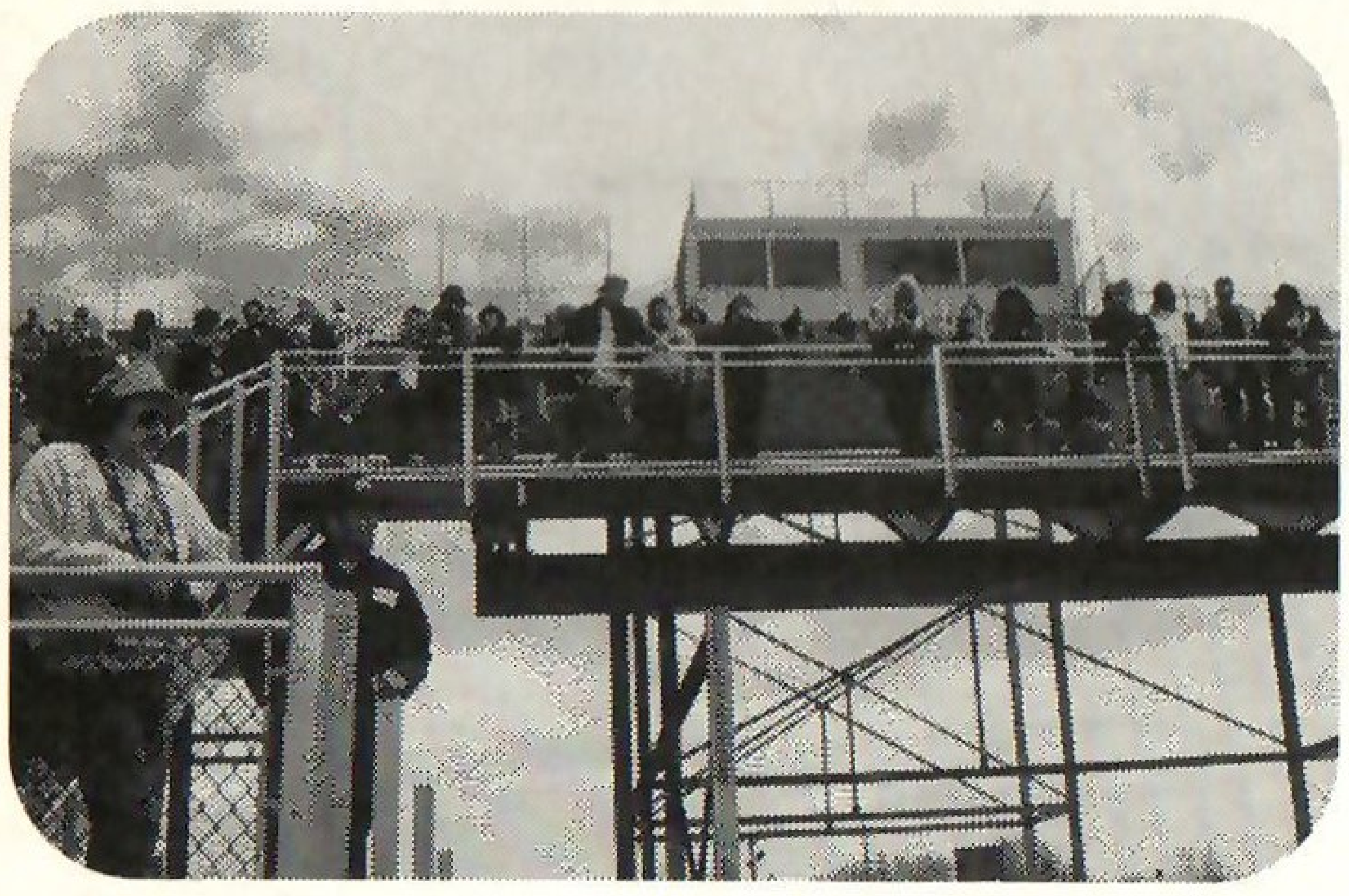
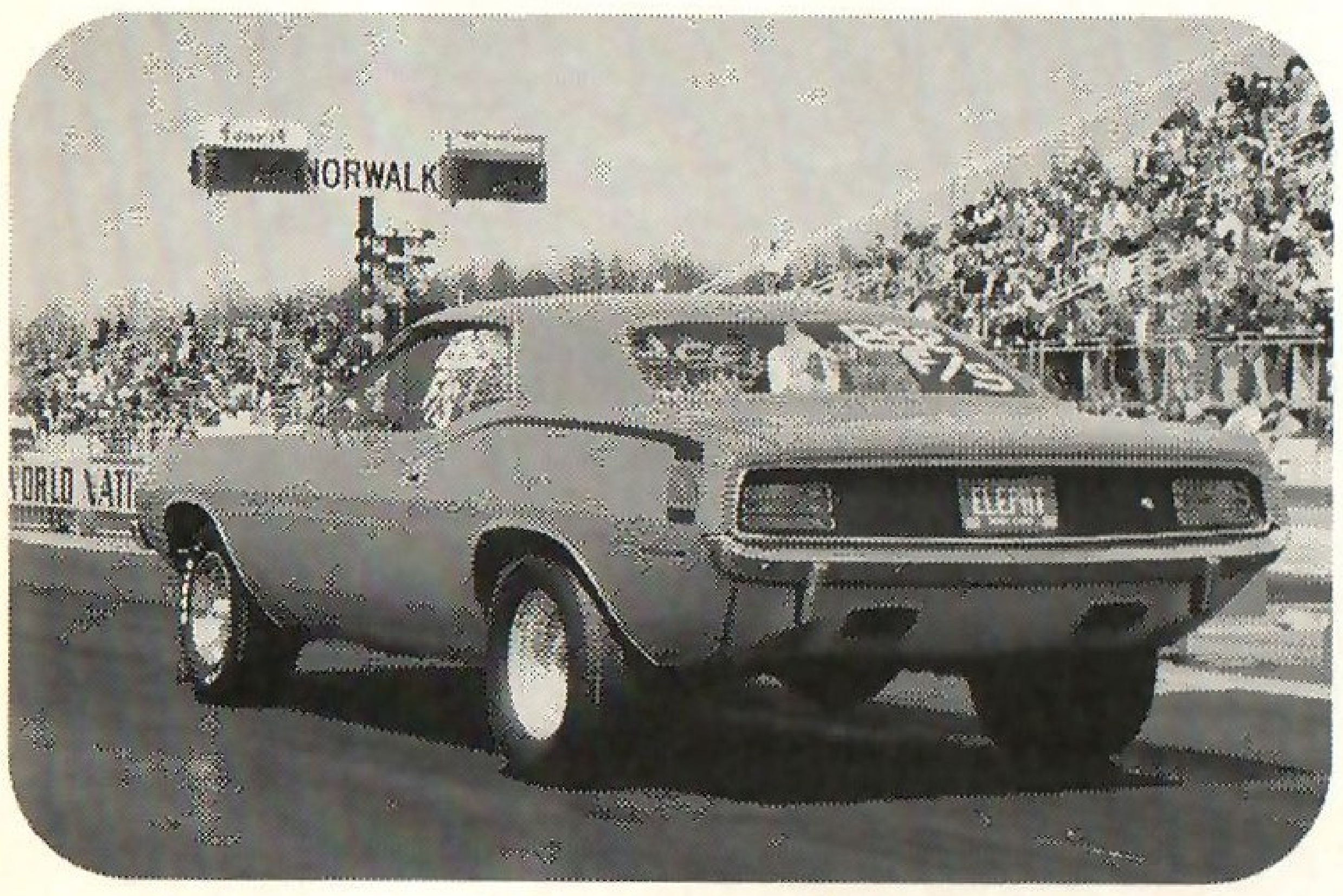
Rain-weary NMCA racers travel prepared. We'd like to tell you whose car this is and what class he runs, but we're stumped for an obvious reason.



Limited Street allows only a 10.5 inch slick or 12.5-inch DOT tire, so Mark Vinson has been tuning his 314 cubic-inch Mustang around the slick and runs mid-9s, so far. That was enough to take his nitrous Ford to the semis in Ohio.



Norwalk's owner, Bill Bader, is constantly improving his facility, which is among the nicest drag strips in the world. He's set an all-new level with this new grandstand, which leaves fans towering over the cars and with a perfect view of the entire strip.



Factory Stock has turned into a crowd favorite, proving which cars were quick from the get-go. Hugh Harwell got to drive Bob Karakashian's '70 Hemi Cuda, which went a best of 12.74 at 108mph.

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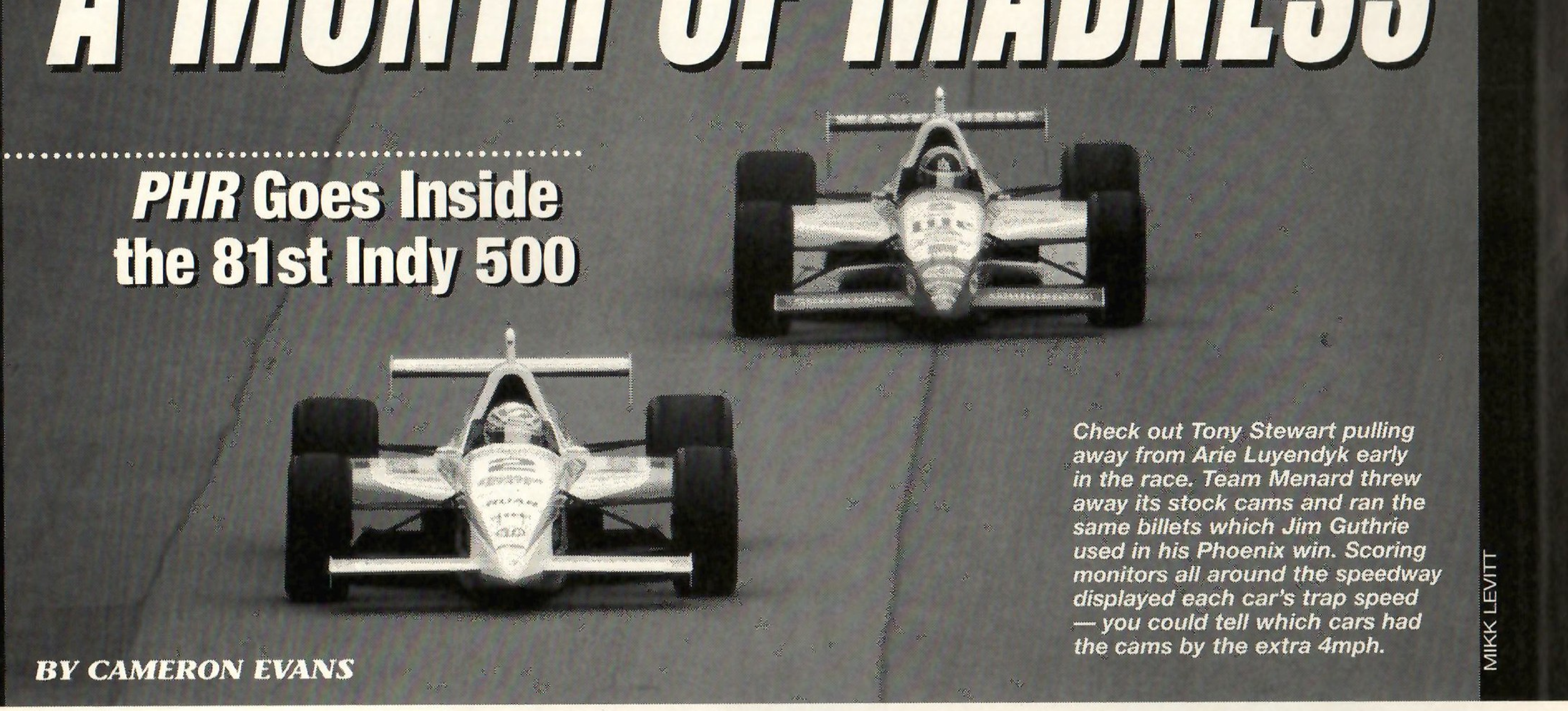
A MONTH OF MADNESS

PHR Goes Inside the 81st Indy 500

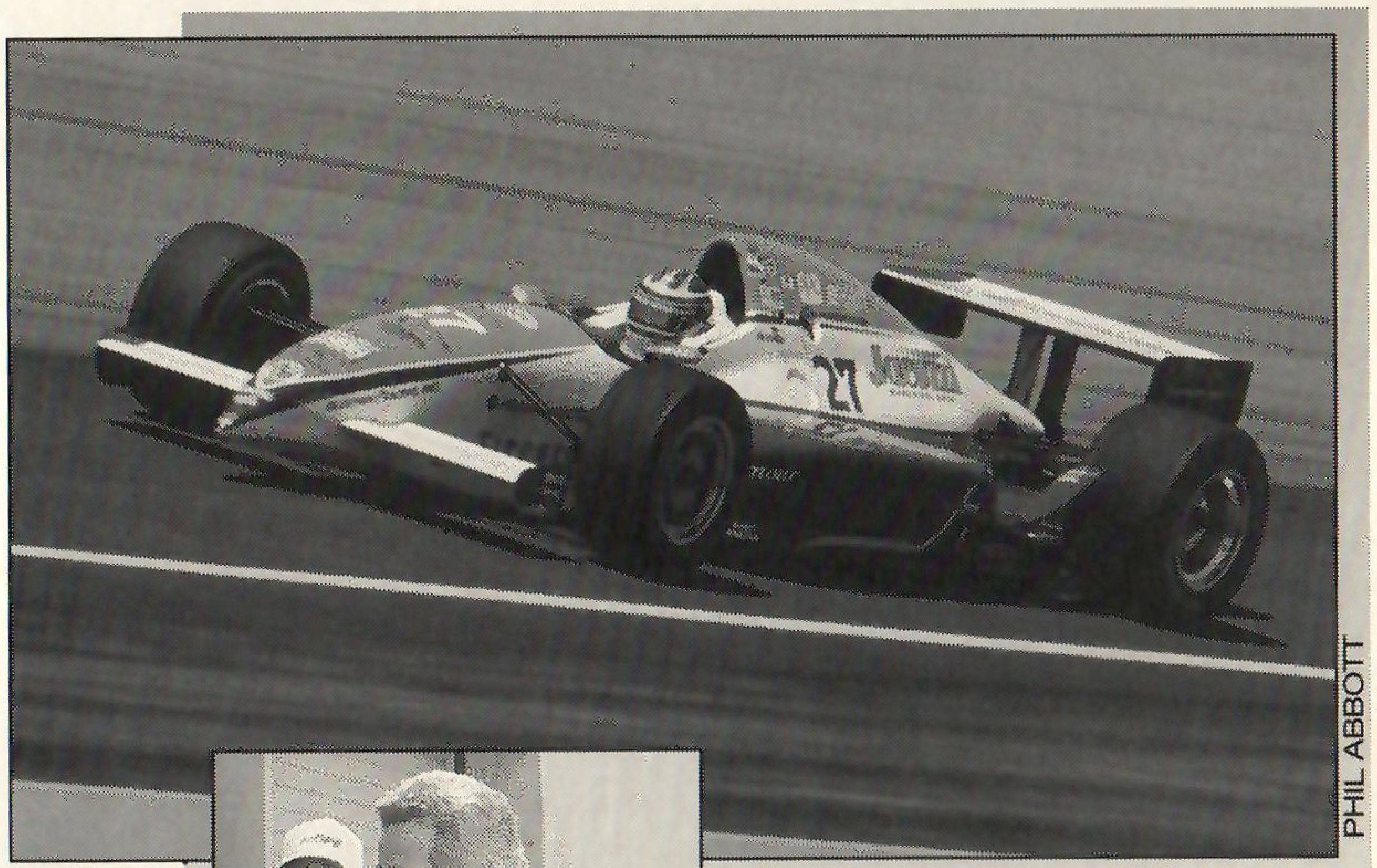


Check out Tony Stewart pulling away from Arie Luyendyk early in the race. Team Menard threw away its stock cams and ran the same billets which Jim Guthrie used in his Phoenix win. Scoring monitors all around the speedway displayed each car's trap speed — you could tell which cars had the cams by the extra 4mph.

MIKK LEVITT

BY CAMERON EVANS

Car guys unite! Regardless of your opinion on the lack of "star" drivers in the Indianapolis 500, nowhere in major-league motorsports has there been such a recent influx of hot rodding input as you'll find within the engines of the Indy Racing League. Period. The Speedway's powerplants are back in the hands of American ingenuity, and it's an exciting place to hang out!



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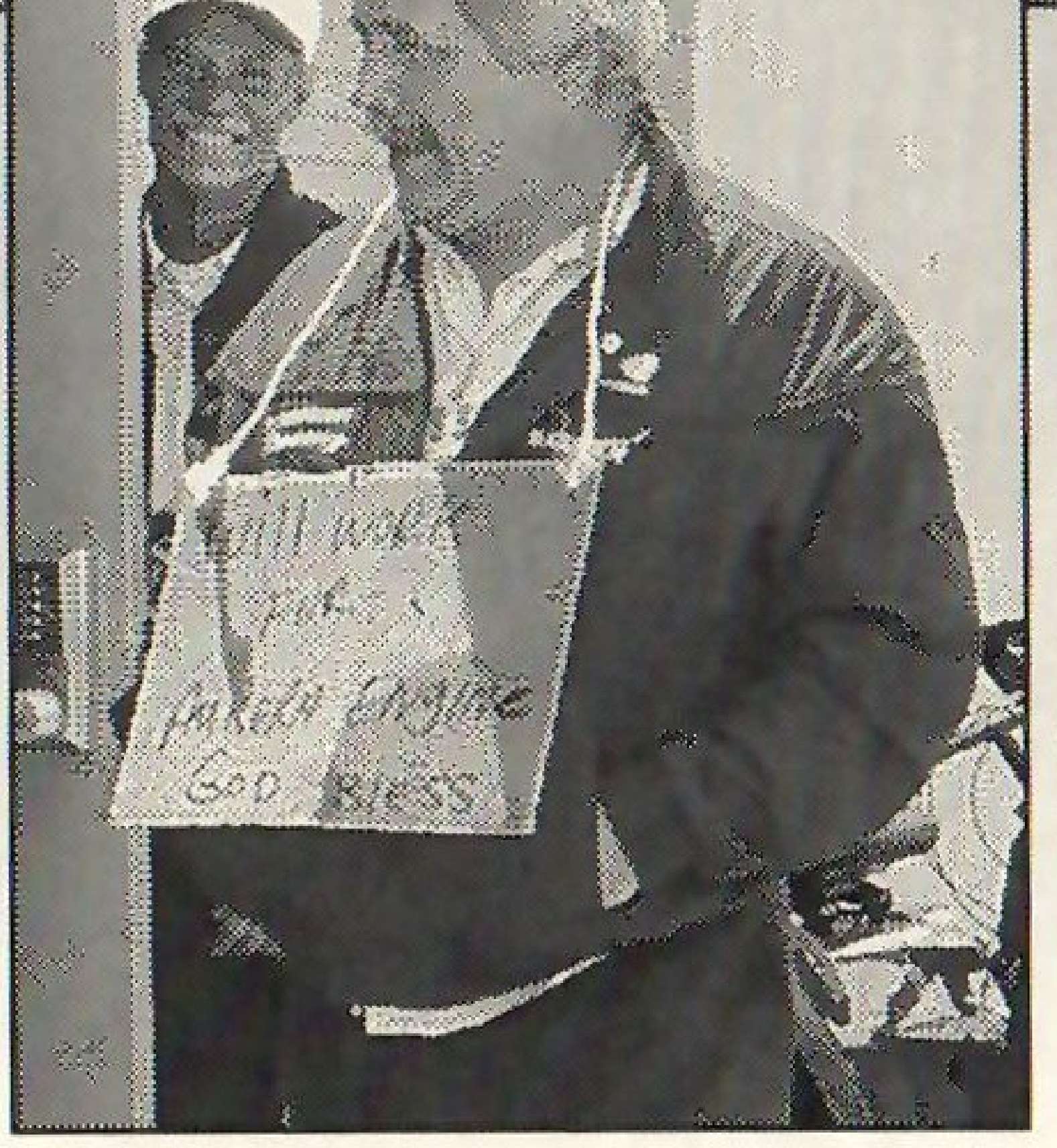

We batted 500 on our predictions for Team Blueprint, figuring correctly that they'd find sponsorship after Jim Guthrie's Phoenix IRL victory, and incorrectly in predicting they'd be fast and reliable at Indy. With three cars and no engines on Carburetion Day (left), Blueprint looked to have bitten off more than they could chew. Guthrie (top) was fast in qualifying and has solidified himself in the IRL ranks.

Back in the June 1997 issue of *PHR*, I promised an "insider look" at the true happenings within the league from the perspectives of Team Blueprint and Crower Motorsports. These are the type of people with which you engine builders and auto enthusiasts can relate, so I tagged along at their invitation. Our base camp was the Bart Wheels/Crower garage, right next to Team Blueprint's stable in the heart of Gasoline Alley. From staying with the Crower family in their corporate apartments, to visiting with old friends from the drags, and partying with the racers at Kelly's Pub, we saw Indy from the teams' point of view. Regardless of the rain, it was exciting, interesting, and disappointing all at the same time.

The politics within the engine situation are immense. Teams won't tell you whose parts they're running for fear of upsetting suppliers and manufacturers. That's not a new problem in racing, but it's now magnified within the IRL. The ability of teams to own their engines gives the aftermarket unprecedented opportunities to replace and/or tweak the Oldsmobile-approved parts. This program was designed by the IRL to work just like it does in Winston Cup (where GM and Ford eventually supply only blocks and heads) and it will eventually sort itself out.

Coming off a victory in Phoenix, I predicted Blueprint drivers Jim Guthrie and Sam Schmidt could surprise the mega-buck teams with their NAC-built Olds Auroras, but I was wrong — the team failed for many complex reasons. First of all, our *PHR* scoop was lost before our IRL story hit the newsstand, as Team Blueprint split with Crower soon after the Phoenix win over a miscommunication about Crower selling its powerful Olds camshafts to other teams. The sponsorship was terminated and Blueprint had NAC's Mickey Nickos return their engines to stock trim. Everybody was on good terms, but it was a strange situation in Gasoline Alley by comparison to the happy-go-lucky days I experienced a few months prior in the Phoenix garages.

I found that Blueprint's Phoenix victory meant unpredicted trouble for NAC, as the flood of interest in their reliable engines caused too much demand — the time Nickos spent on perfecting

(Continued on page 88)

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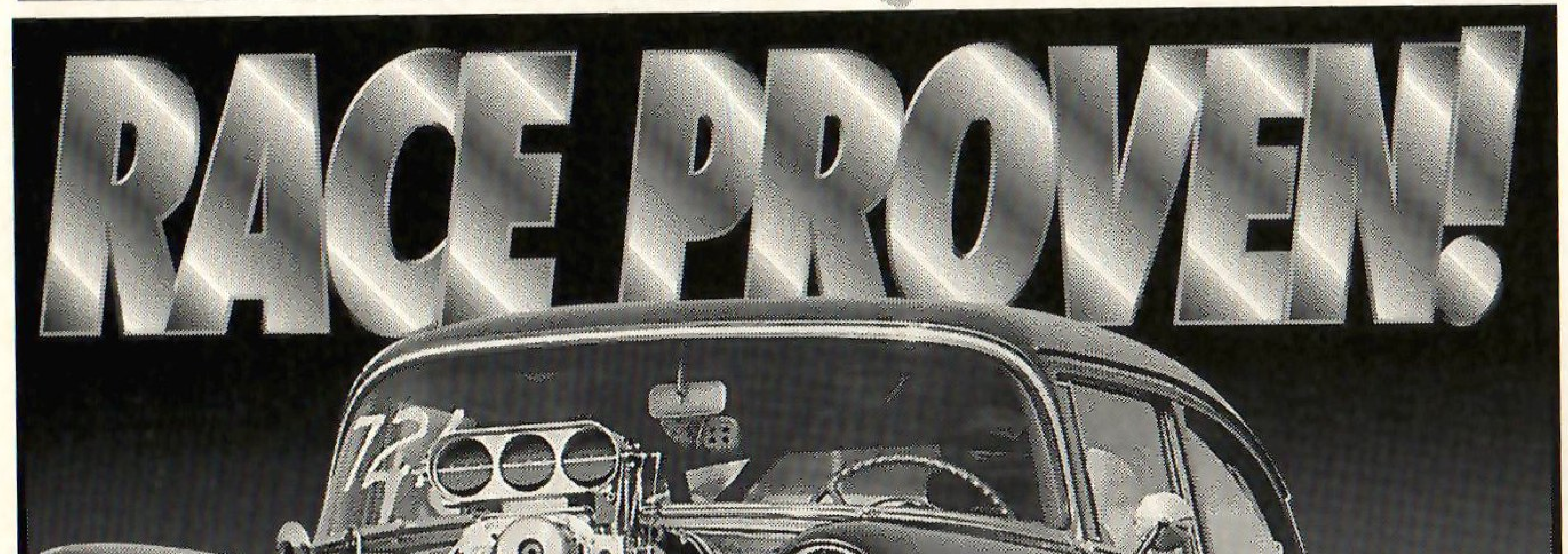

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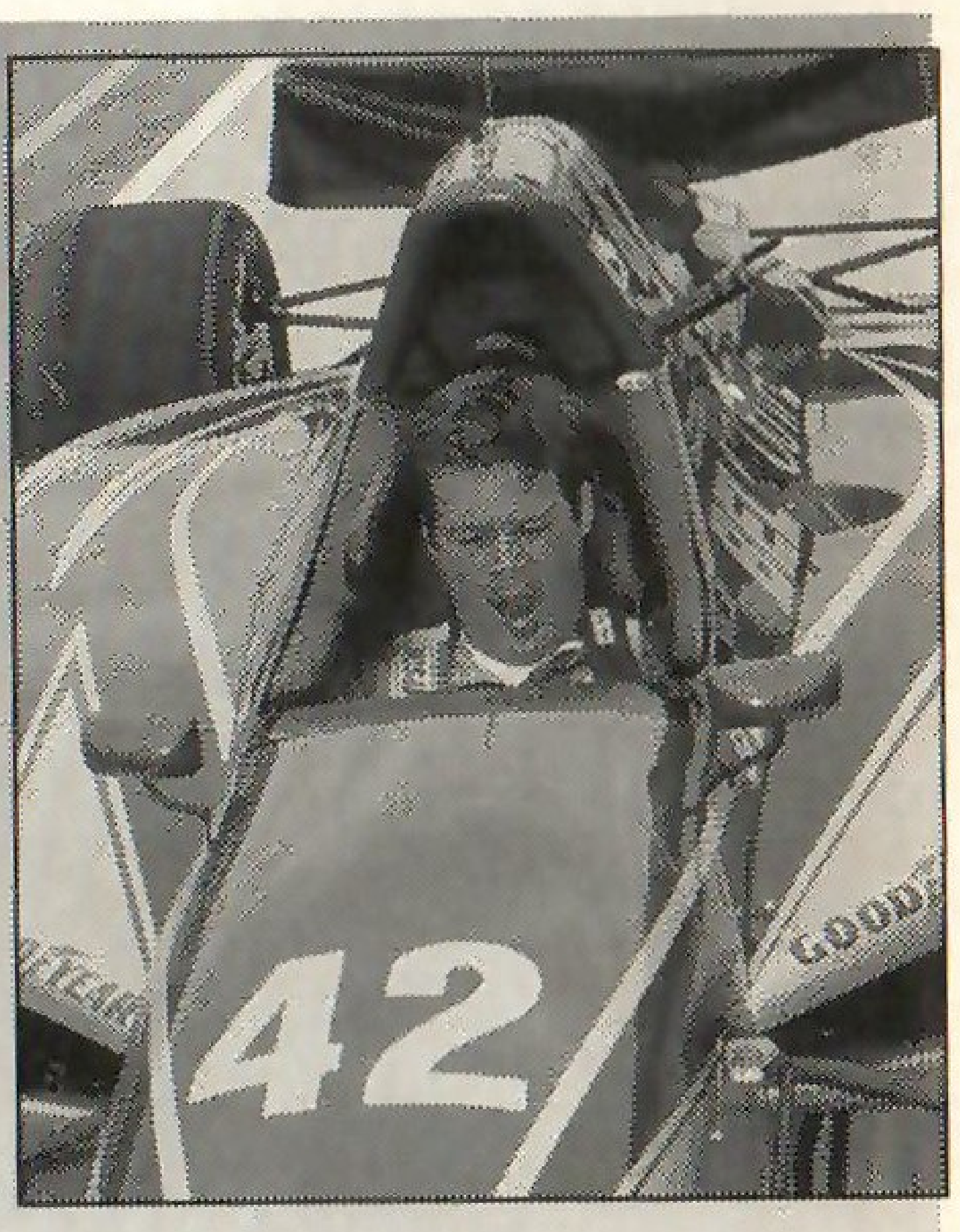
A MONTH OF MADNESS

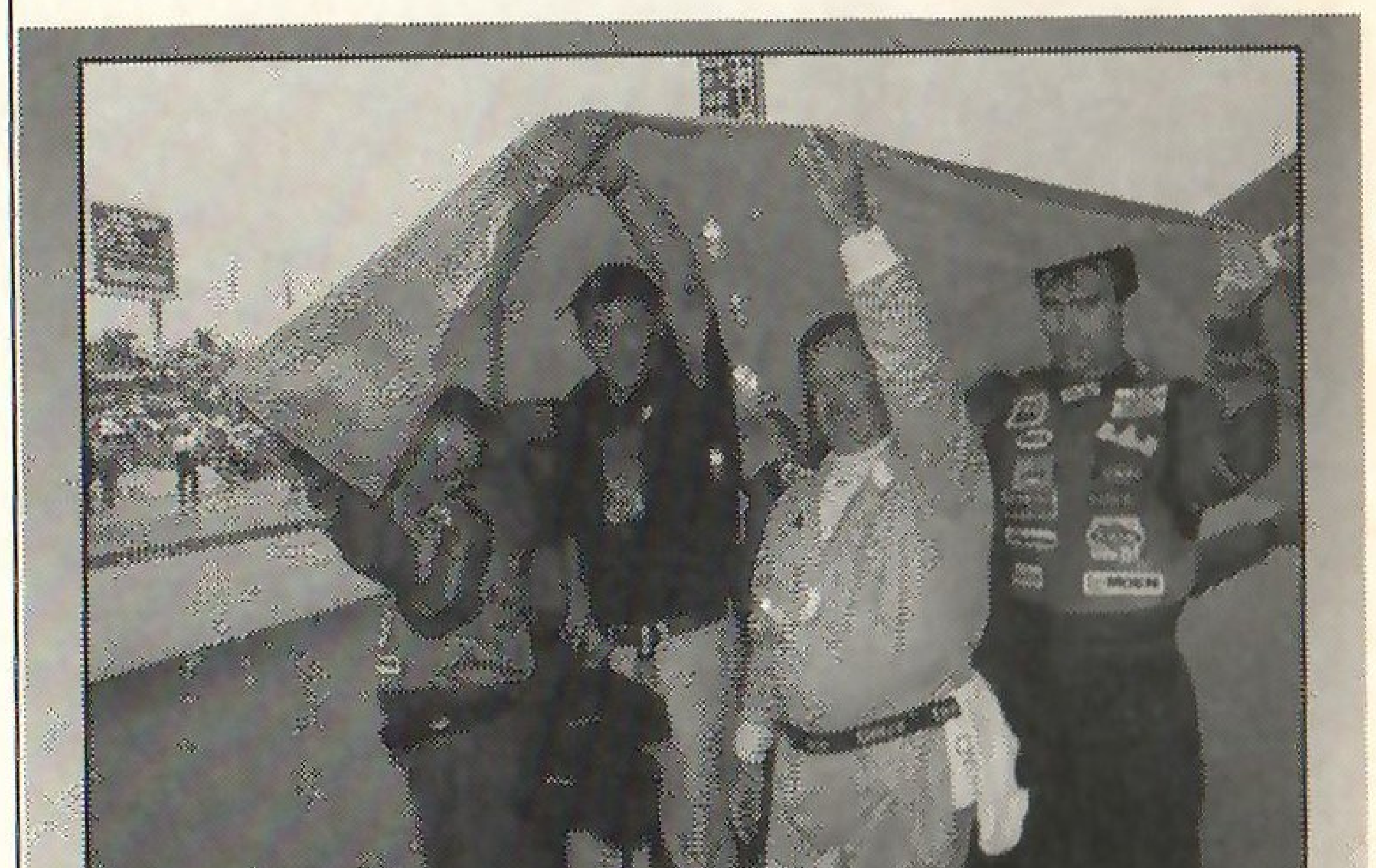
(Continued from page 86)

the winning Guthrie engine was then spread over many more customers, resulting in failures on both the dyno and the track. The Texas Motor Speedway blowups two weeks later didn't help, and their dissolving relationship with Blueprint could be a blessing in disguise for NAC. Even Blueprint's drivers look to be going they're own ways, as Schmidt took back his car after Dallas and Guthrie now owns two cars himself and just bought a Menard engine — the only thing Blueprint founder Ed Rachanski seems to own is the entry numbers with the Indy Racing League!



Sleepless nights must have caused this yawn from Robby Gordon, as it certainly wasn't from boredom. His busy month was filled with blown up engines, helicopters, private jets, and a charge from 12th to fourth place in the first 10 laps. Incidentally, his raceday fire was caused by a broken O-ring on the fuel inlet, which allowed the tub to fill with fuel and run down the shifter rod, where it somehow became ignited.

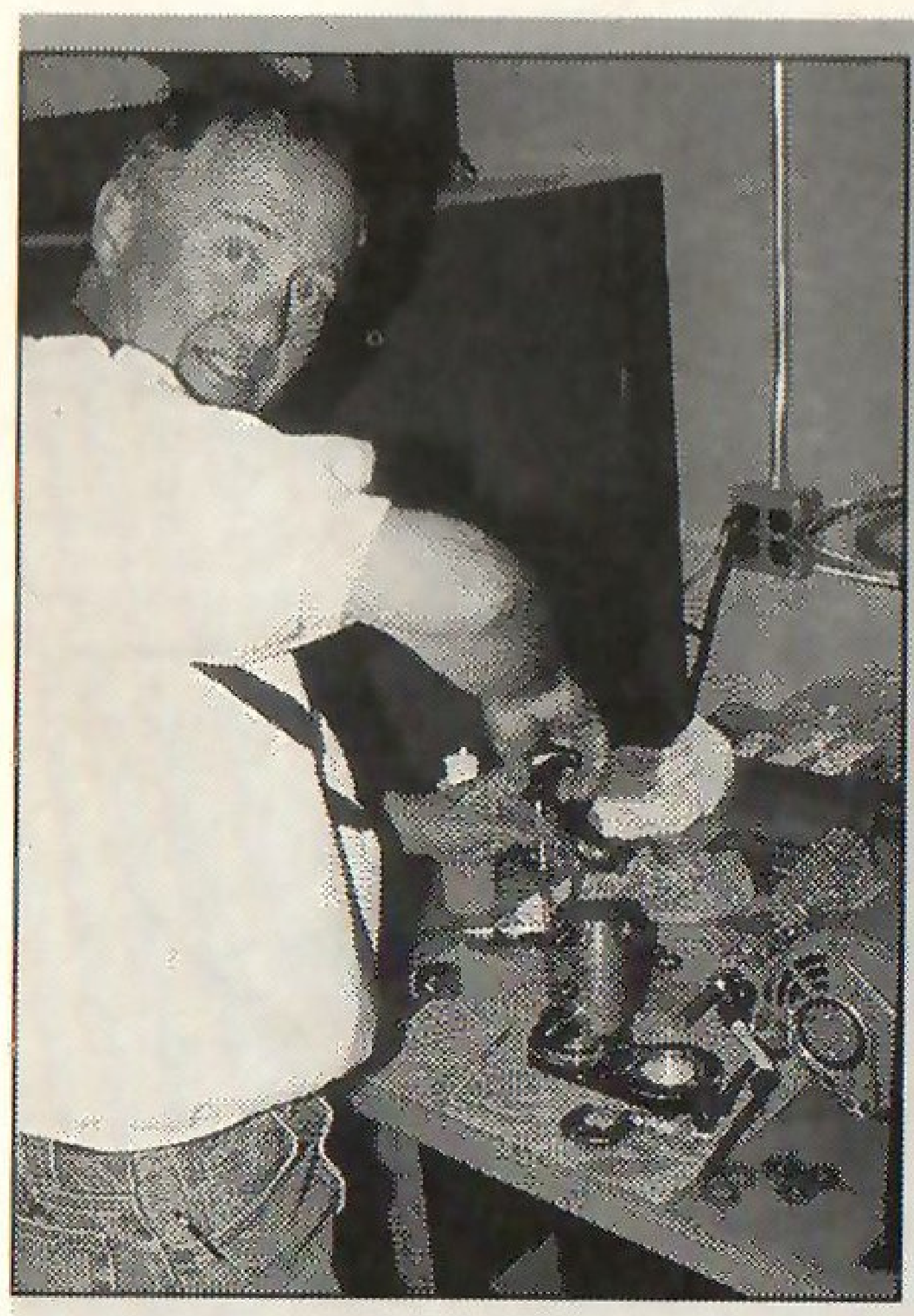
All this wasn't a heartbreak for Crower, as many teams like Menard, Cheever, Foyt, and the surprising Greg Ray entry, ran the cams with less duration and steeper ramps to shift the power curve back in the rev band, providing undeniable power off the corners and unmistakably better trap speeds in the short chutes. Drivers like Tony Stewart and Jeff Ward showed their power in the race, and those who knew which engines had what parts understood the technical advantage.



When you're on the grid and it starts to rain, you run for the nearest team and beg for space under their tarp! The Chitwood team needed a tall post for their tent, anyway.

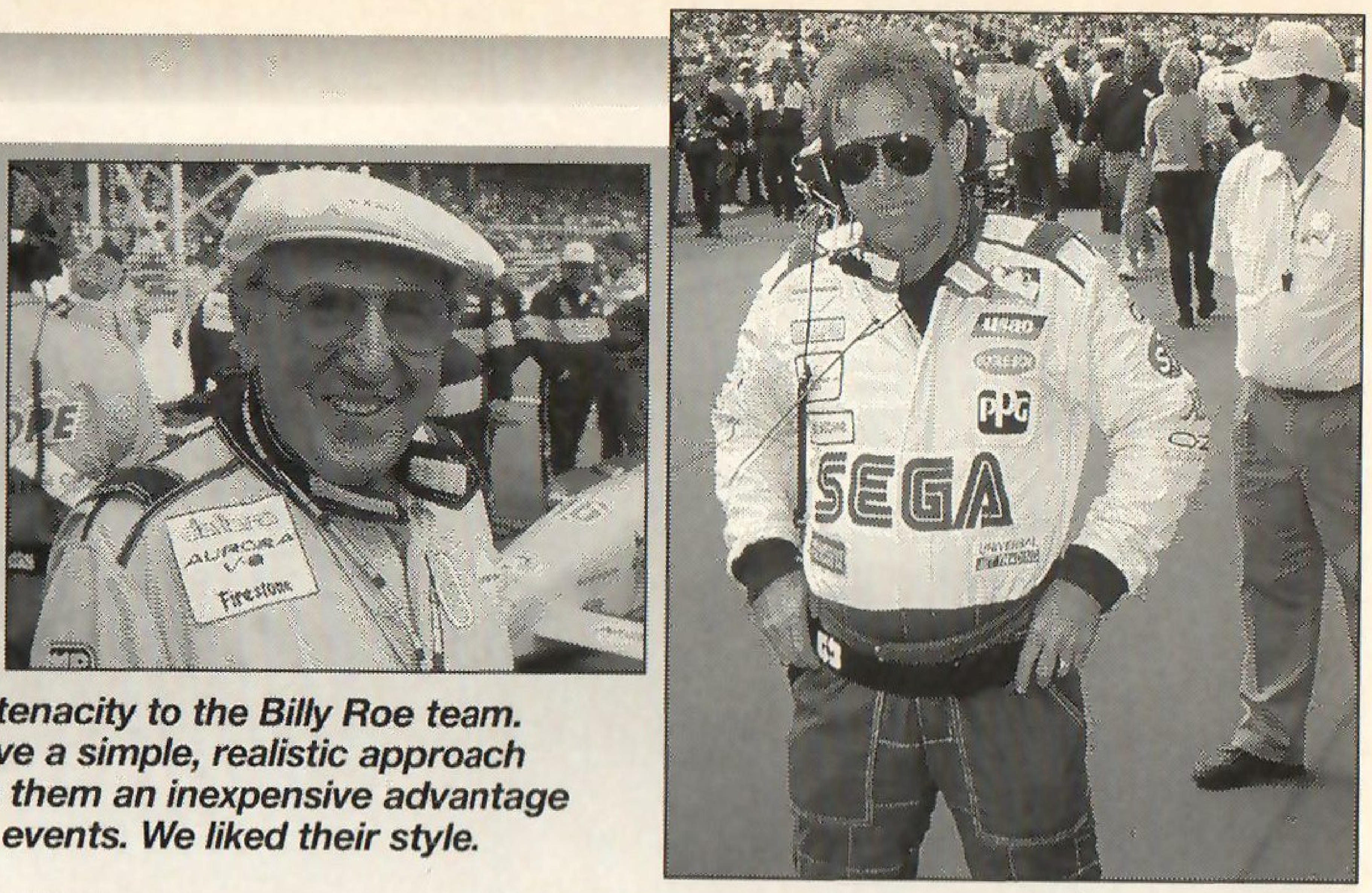
The teams opened their doors to *PHR*, to a point that I saw parts and situations which I simply can't write about. I can tell you a bit about watching Dan Crower completely disassemble Robby Gordon's windowed engine after Carb Day, spreading parts around the Team Sabco garage like it was a Top Fuel trailer. It may be the first time an engine had been disassembled in the garage area by a team (with open garage doors!) in over a decade, and it signified a new era and growth within the sport. The PDM team clued in Brian Crower and me with access to their Pi and Delco telemetry, showing us that there's no magic to running these cars — they're just dynamic, precision vehicles which require solid thought to operate.

I didn't realize it at the time, but the Indy 500 we all followed so closely a few years back was mostly an exercise of British engineering. Now, it is once again an American race and you should celebrate that, regardless of whether Al Unser, Jr., and Michael Andretti keep driving with CART. Yes, innovation is now limited to the specs of a production cylinder block, and Penske will never come back as long as he's forced to make his cars available to half the field, but that could change as the IRL progresses. Better yet, if the IRL continues its struggles, look for the League to accept innovations.

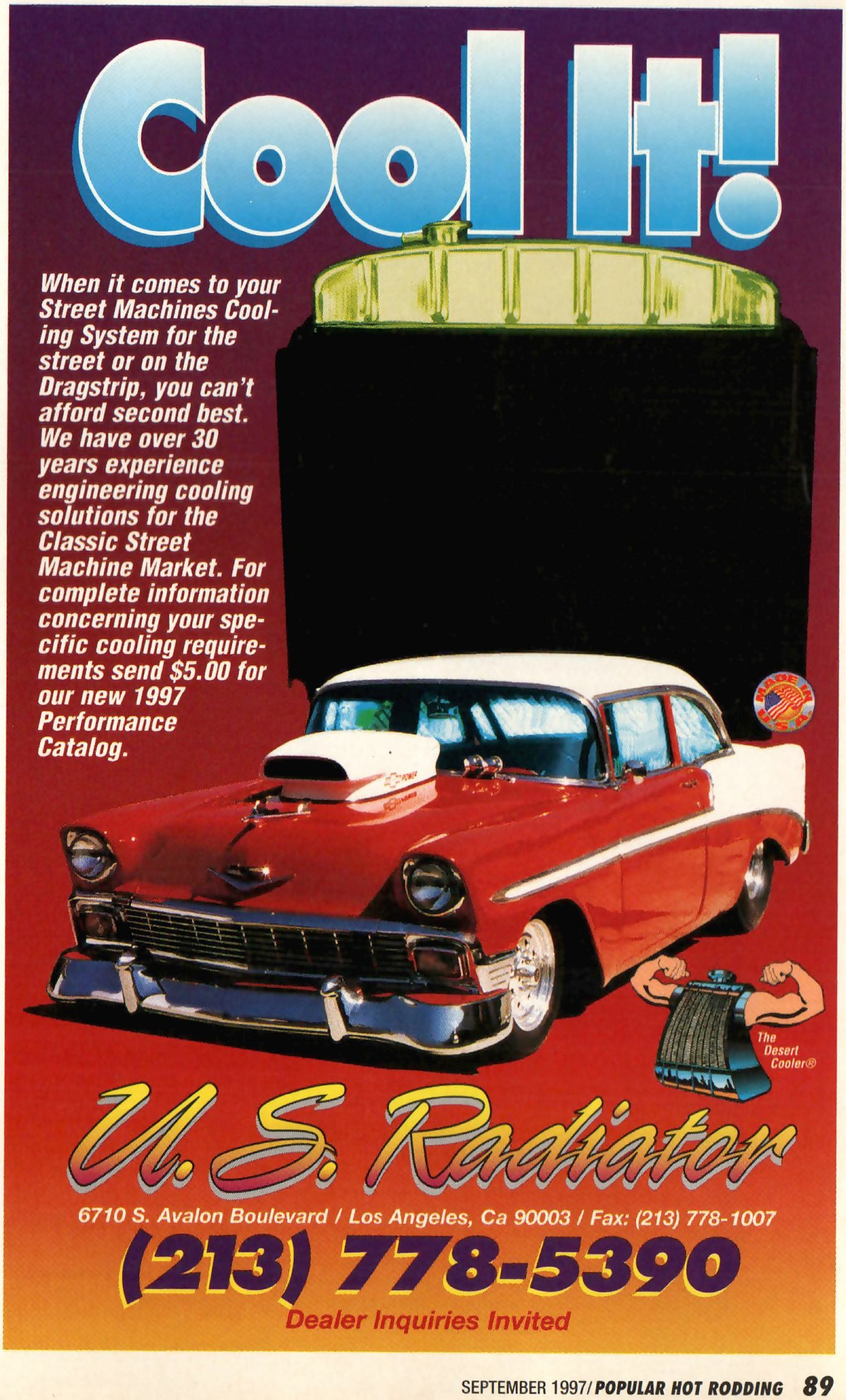


Pump guru Sid Waterman had the best 500 imaginable — as his fuel pumps were in each and every entry, he was guaranteed a victory. Sid's complex pumps are located deep inside the tank and feature two inlets, scavanging from opposite sides of the tank to get that last bit of fuel from a nearly-empty tank. He volunteered his time in May to help the teams and was based out of the Brayton Engineering garage on Gasoline Alley.

Yeah, the rain took all the energy away from the race by Monday's second delay. But, I'll never forget walking up the grid on each race day, wishing good luck to all my new friends. Just being on the grid, loaded with new-found knowledge on what makes the engines go (and what doesn't) provided a perspective that'll never get old. Man, if I could only find a couple million dollars....



Friendly George Bignotti, the multi-time winning car owner and chief mechanic, and his talented, hard-edged son, Billy, brought a wealth of tradition, experience, and tenacity to the Billy Roe team. The Bignottis have a simple, realistic approach which could give them an inexpensive advantage in upcoming IRL events. We liked their style.



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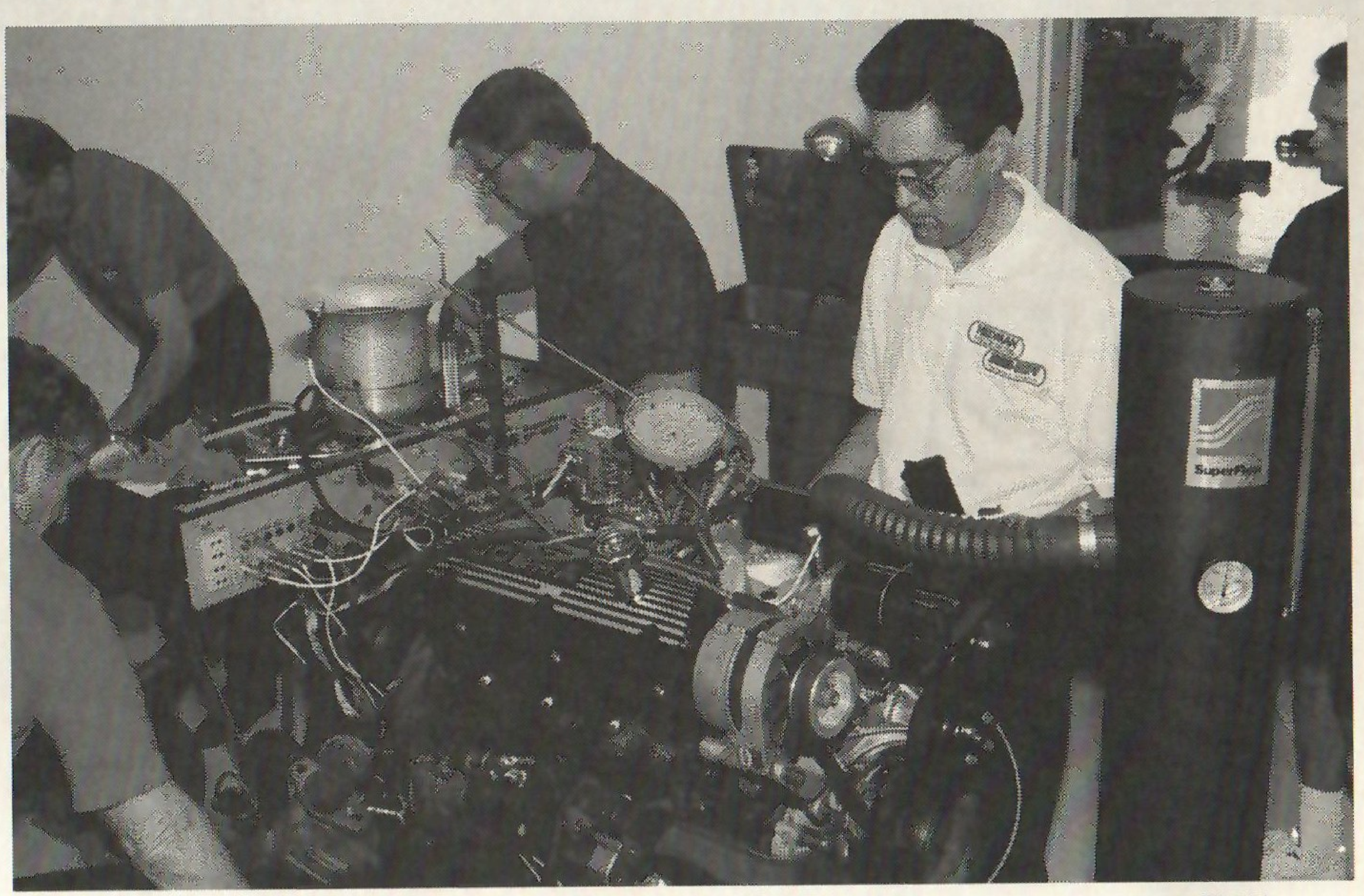
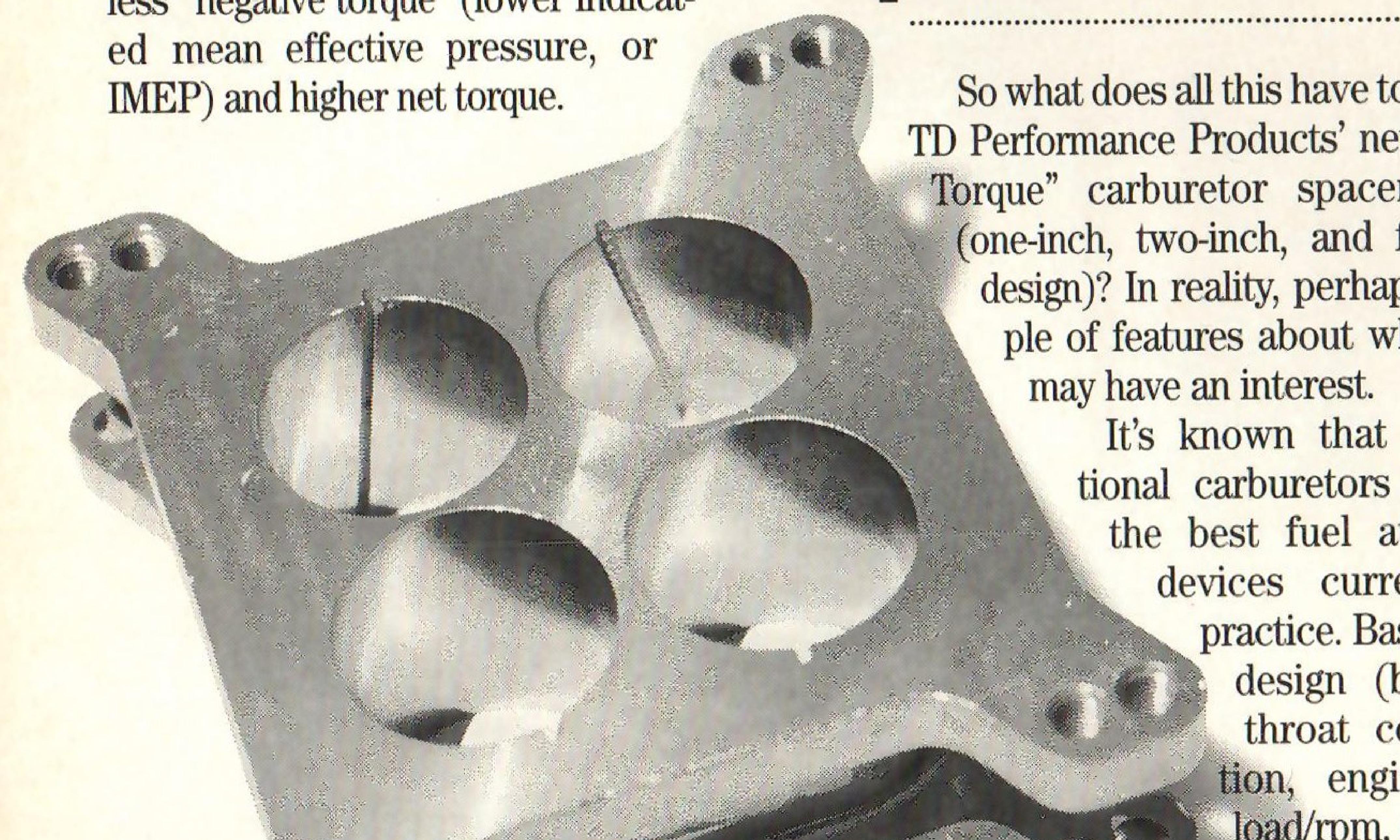
BY JIM MCFARLAND



Pump Up Your Engine's Torque with this Computer-Designed Carburetor Spacer Plate. It's a True Bolt-On!

To understand the benefits of the revolutionary new carburetor spacer plate from TD Performance Products, it's necessary to dig into the theory behind why and how it works. And to do that, maybe we should quickly examine the elements of good combustion efficiency.

First, we know that to achieve good torque (power) an engine must burn or "combust" a high percentage of air/fuel ratio (larger drops tend toward rich mixtures, small ones to lean ratios). Plus, smaller drops are "burned," or oxidized more quickly than larger ones and offer several benefits to improved combustion efficiency and performance. It's also proven that any given air/fuel mixture that is not only of small droplet size but uniform in size will burn more evenly (less prone to detonation) and smoothly throughout the combustion process. And, as a rule of thumb, the more quickly a mixture burns, the less spark ignition (lead) is required. Bottom line here is this results in less "negative torque" (lower indicated mean effective pressure, or IMEP) and higher net torque.



This close-up reveals the computer-designed angles of the "Swirl Torque" slots, engineered to improve air/fuel mixtures immediately after passing through the carburetor throats.

So what does all this have to do with TD Performance Products' new "Swirl Torque" carburetor spacer plates (one-inch, two-inch, and four-hole design)? In reality, perhaps a couple of features about which you may have an interest.

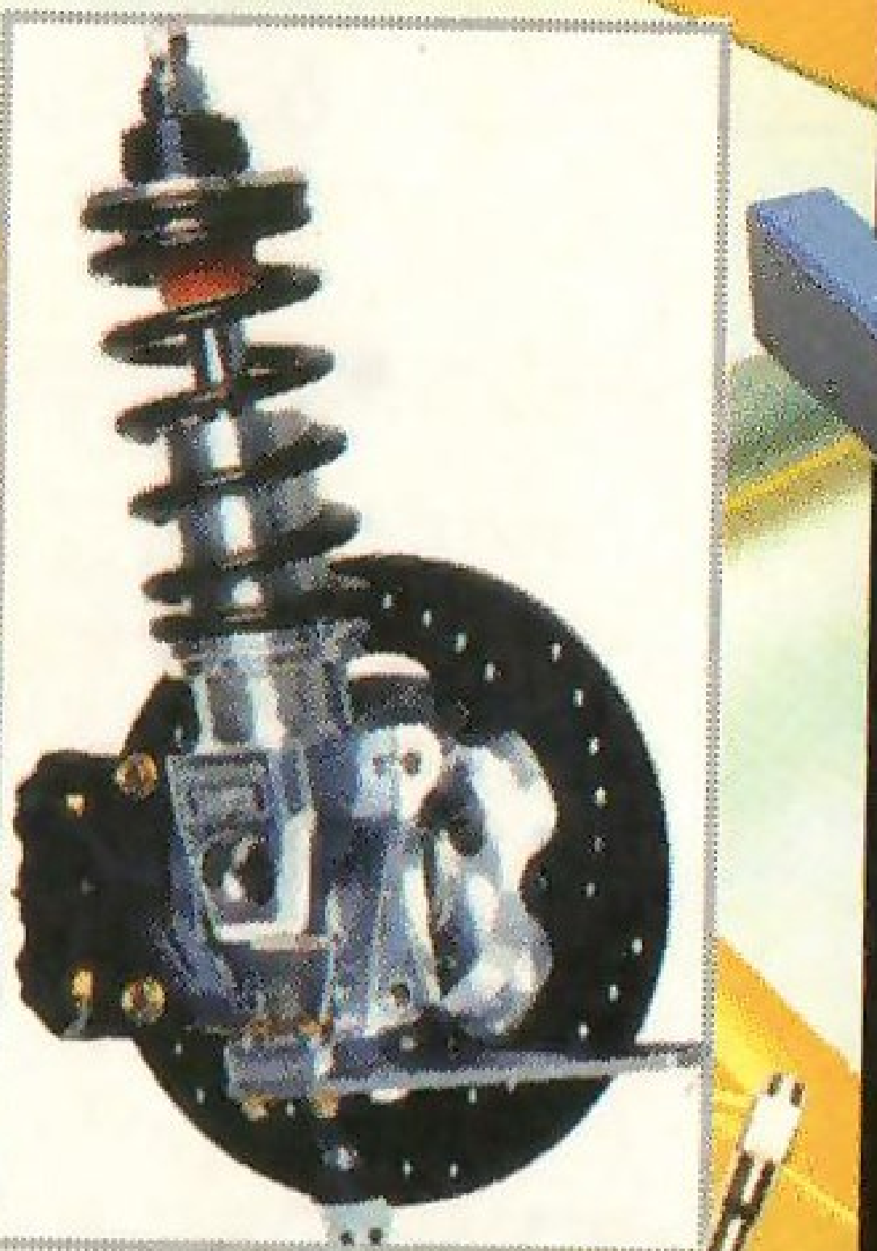
It's known that conventional carburetors are not the best fuel atomizing devices currently in practice. Based upon design (boosters, throat configuration, engine size/load/rpm, etc.), air/fuel mixtures produced tend to range in droplet size and overall uniformity. For reasons previously listed, we know proper fuel atomization is a key to good combustion efficiency. We also know that the cost of fuel metering devices (carburetors being only one) is an economic factor and one of concern to many performance engine enthusiasts.

TD Performance Products considered these among the issues toward improving engine performance with a cost-effective, simple bolt-on part. In fact, the belief was that by post-carburetor treatment of otherwise poorly mixed air and fuel, combustion efficiency could be improved . . . along with the attending benefits this typically provides.

Using (literally) state-of-the-art computer design and modeling techniques, the "Swirl Plate" idea was developed. Since these computer-aided methods allow the "running" of engine models on

(Continued on page 92)

Super Class Strut



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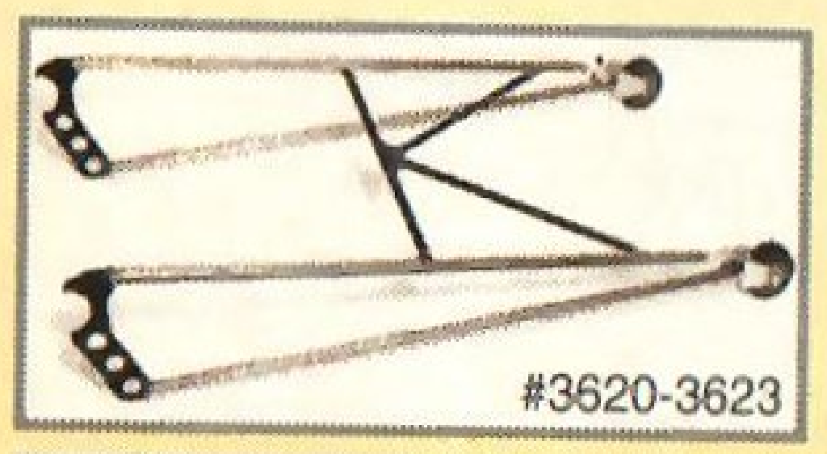

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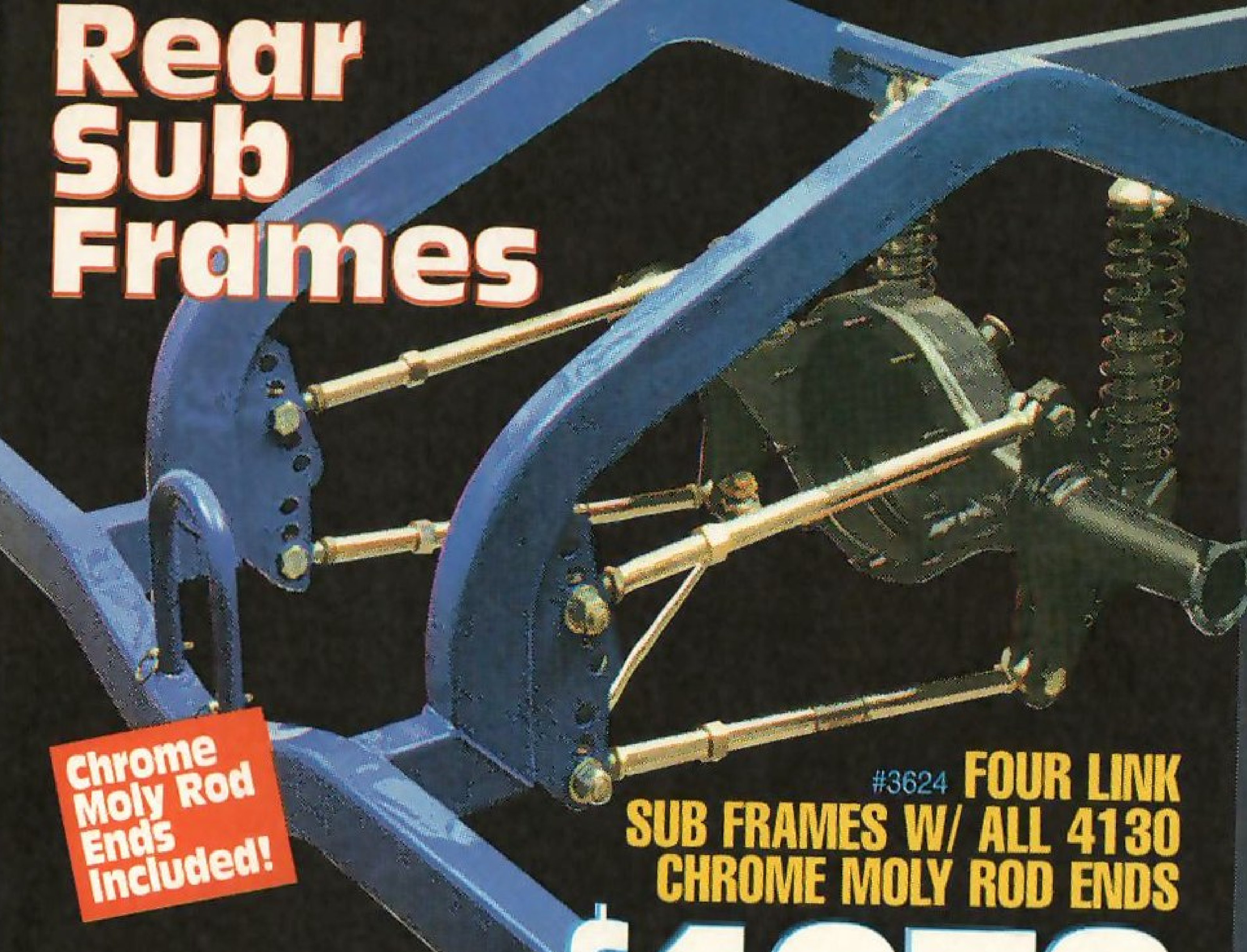

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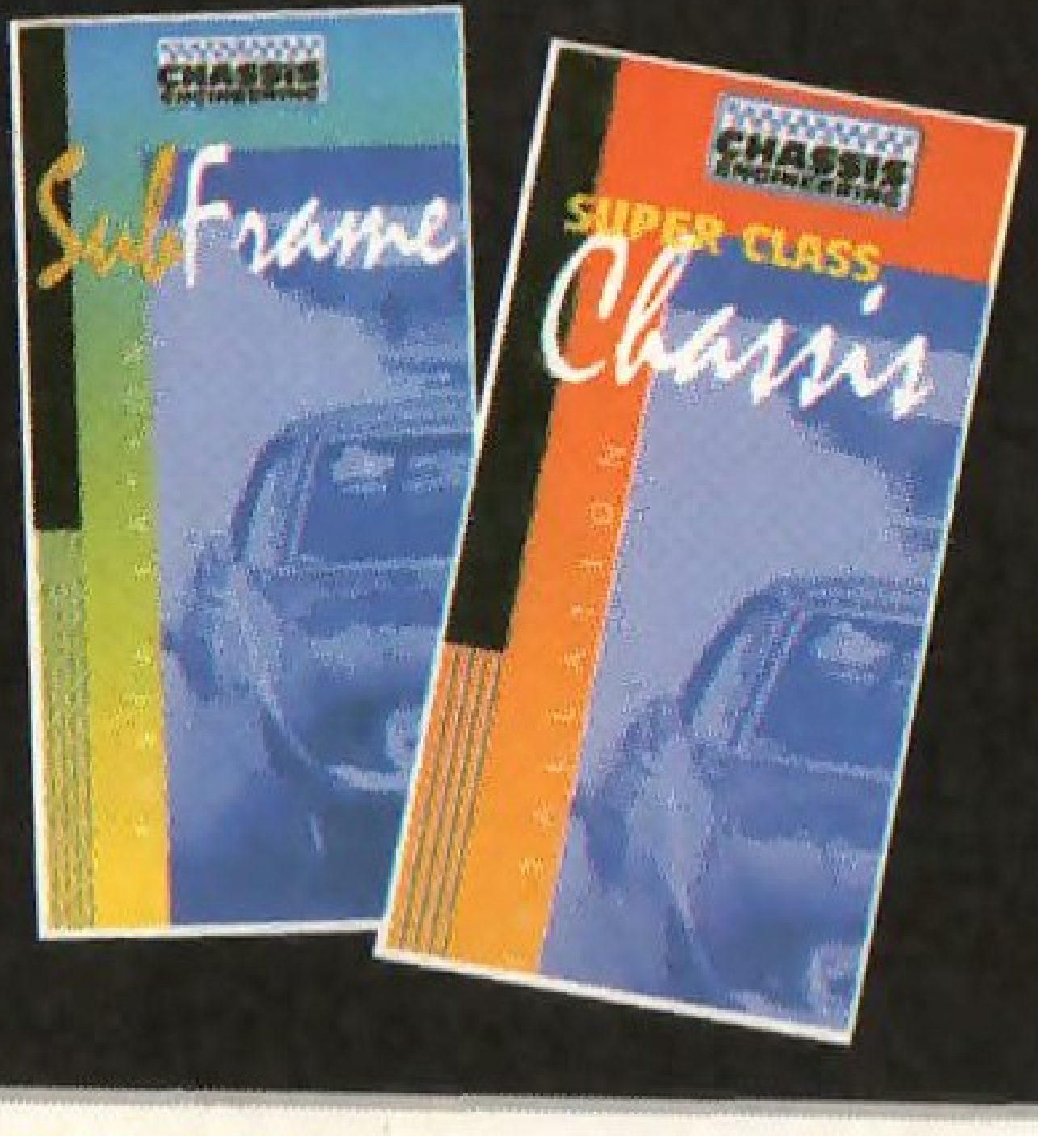

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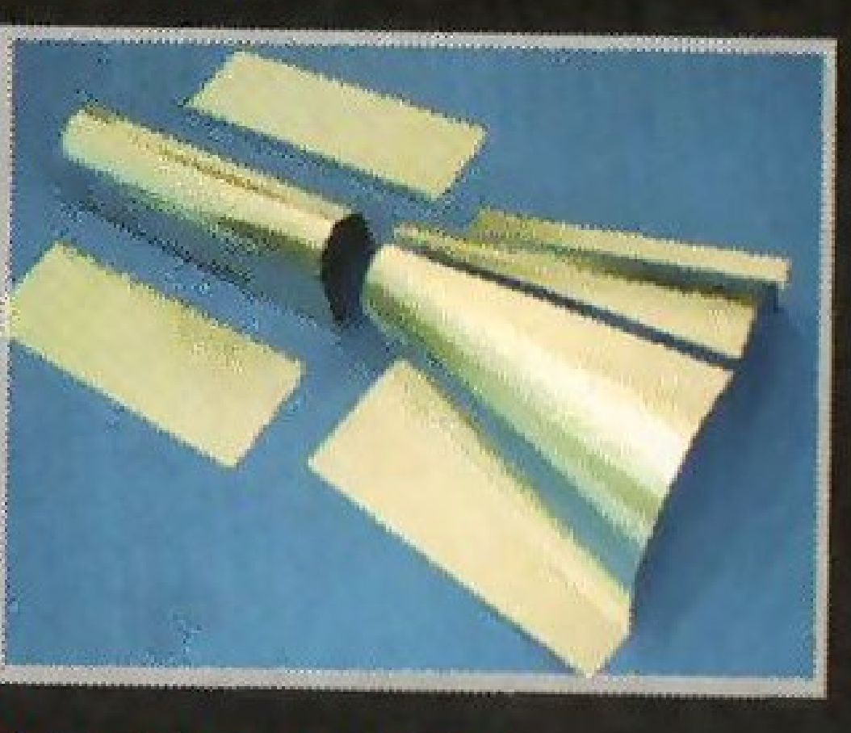

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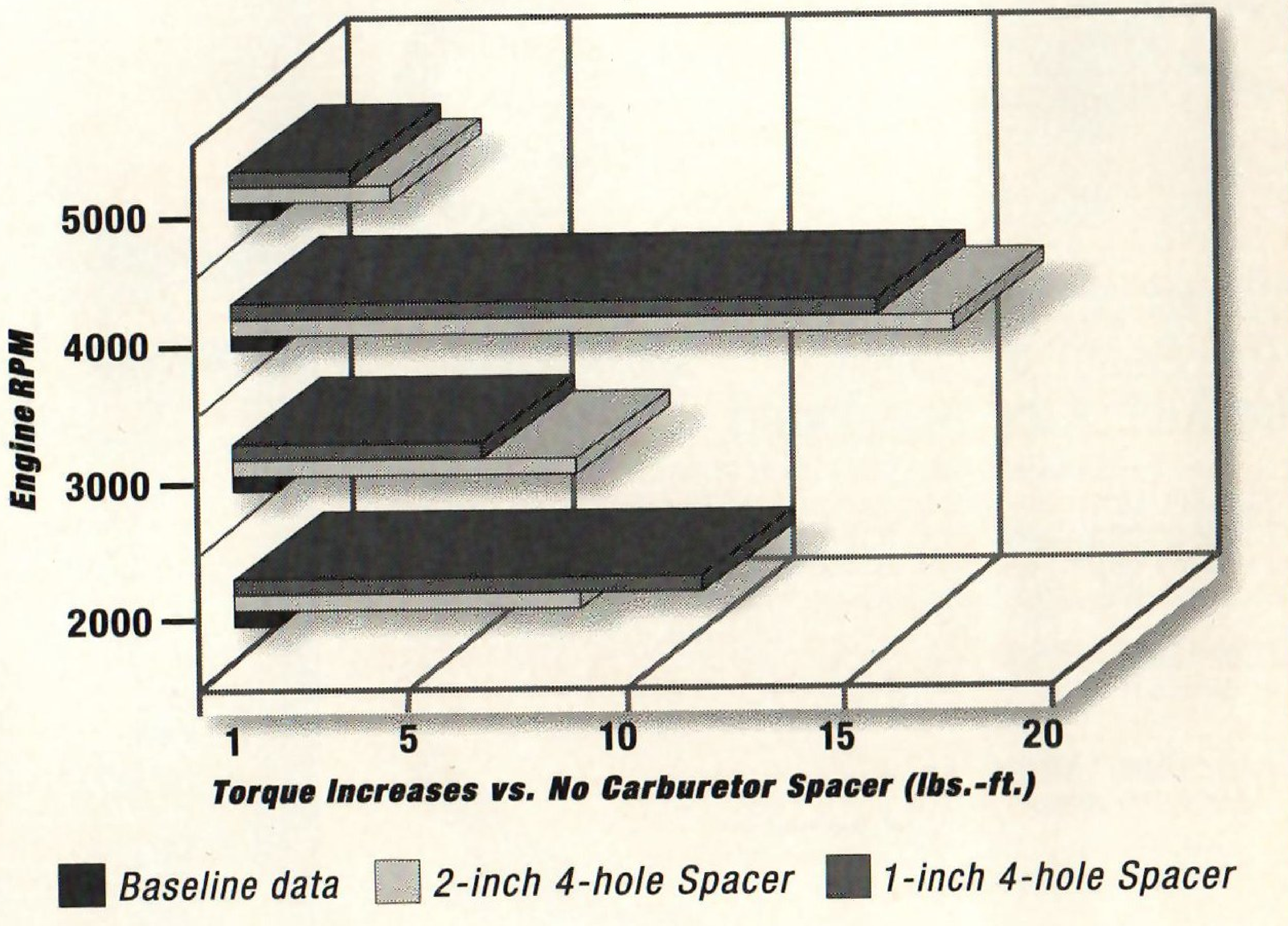
the computer, swirl slot size, number, location, and angle (relative to spacer flow direction axes) were determined prior to "live" testing. Anticipated torque improvements were also modeled which, as it turned out, were interestingly close to the data obtained when the parts were evaluated on an engine dyno (see attached results). As a side note, other TD Performance Products (and parent company Hedman) are currently being designed using these same computer-modeling techniques.

The data included with this story is not optimized from the standpoint of best power jetting and spark timing. In fact, the computer model suggested that the Swirl Torque plates offer the opportunity for maximizing performance with less fuel and timing than run during the dyno tests that produced the information shown here. Of the reasons this appears logical is the fact that improved fuel atomization should require less net fuel flow, and require reduced spark timing, primarily because the more finely-blended air/fuel mixtures burn at a faster rate . . . thereby not requiring spark to be initiated as soon (relative to TDC piston position). Had these changes been made during the dyno tests (certainly for in-vehicle evaluation), further gains would have been likely. However, due to the vast variety of vehicles for which the plates are intended, ultimate optimization/tuning of their design is left to persons who've installed the parts.

What are the best uses for the plates? They are many, and quite varied. Essentially, gains in combustion efficiency can translate into a variety of applications. Among them you can include torque gains for acceleration, towing, hauling, passing, fuel economy, or outright quarter-mile performance. In fact, in the end, it all boils down to the old expression of "You pays your money and you takes your pick." In the case of TD's "Swirl Torque" carburetor spacers, both ends of this axiom appear to work. ▨

Torque increases using "Swirl Torque" Carburetor Spacers (1" 4-hole & 2" 4-hole



Note: By comparing net air flow data from test to test, it is evident that the "Swirl Torque" spacer plate improves combustion efficiency (same air, more torque) by virtue of the mixture motion being imparted to post-carburetor air/fuel mixtures. This improvement in mixture "quality" results in a higher percentage of burned fuel for each air/fuel mixture delivered to the engine. Test-to-test fuel flow equality (comparisons) reflected the same similarities as the air flow data. Engine: Ford 289ci V-8, Hedman "Tork-Step" headers, 9.2:1 compression ratio, Holley 750cfm carb, "pocket port" cylinder head modifications, street/hydraulic camshaft, Edelbrock RPM intake manifold, 1.079hp per cubic inch maximum horsepower obtained through catalytic converters and Hedman in-car mufflers.

ENGINE DYNO DATA

Without "Swirl Torque" Spacer

Engine rpm	Corrected Brake Torque (lbs.-ft)	Air Flow (cfm)
2,000	245	134
3,000	272	216
4,000	296	310
5,000	282	378

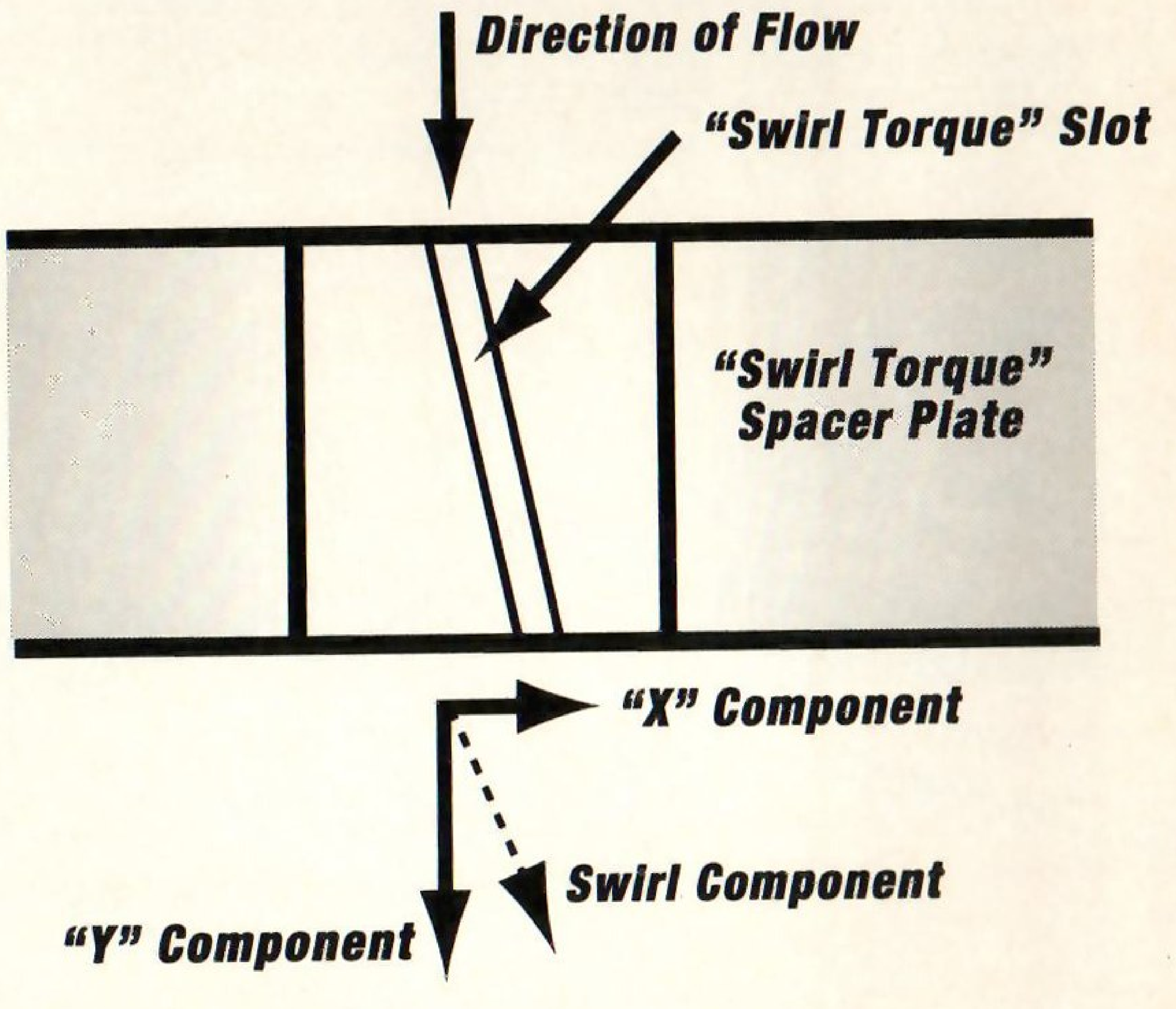
With one-inch, four-hole "Swirl Torque" Spacer

Engine rpm	Corrected Brake Torque (lbs.-ft)	Air Flow (cfm)
2,000	256	132
3,000	277	214
4,000	310	310
5,000	286	368

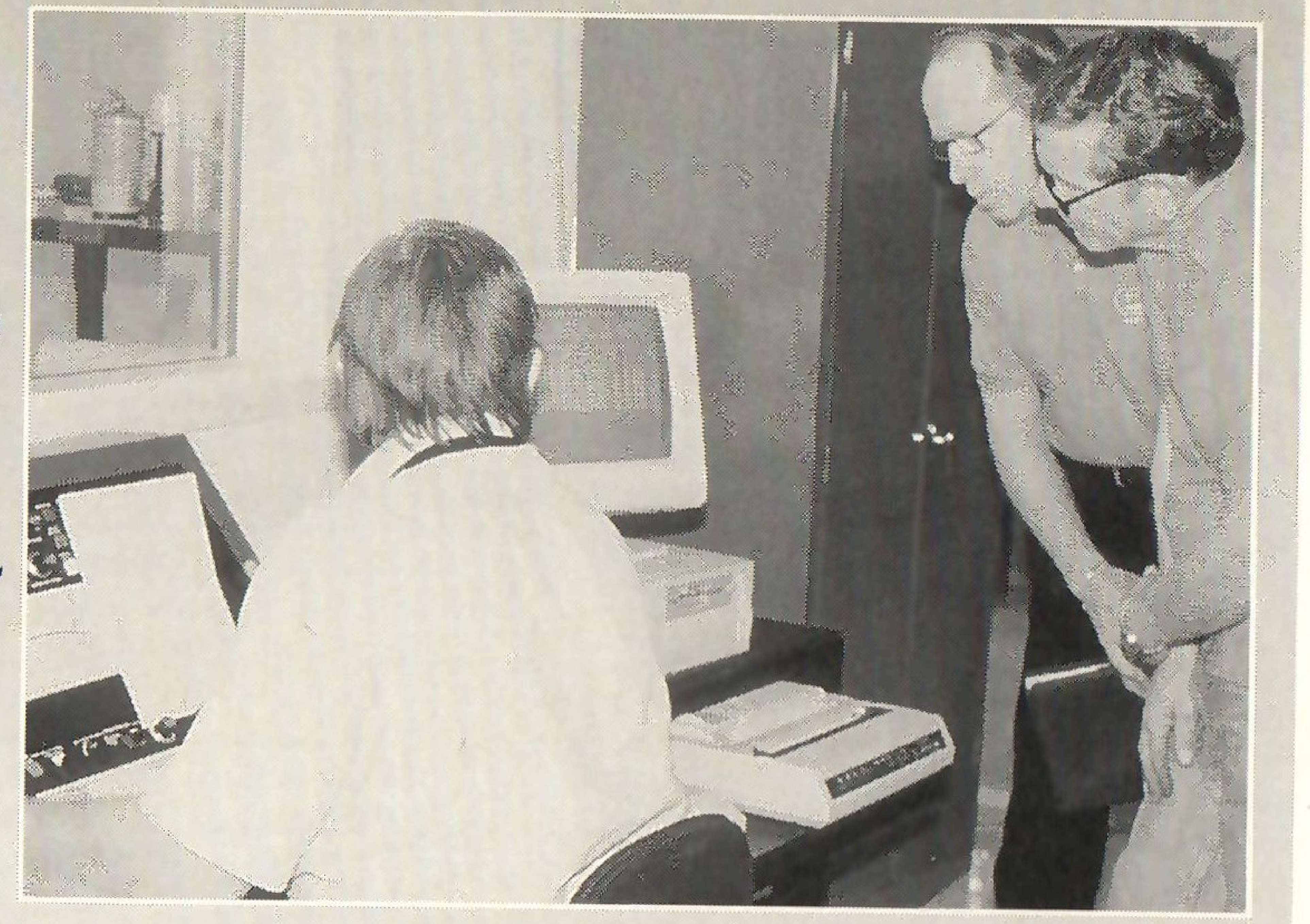
With two-inch, four-hole "Swirl Torque" Spacer

Engine rpm	Corrected Brake Torque (lbs.-ft)	Air Flow (cfm)
2,000	252	131
3,000	281	215
4,000	314	312
5,000	285	370

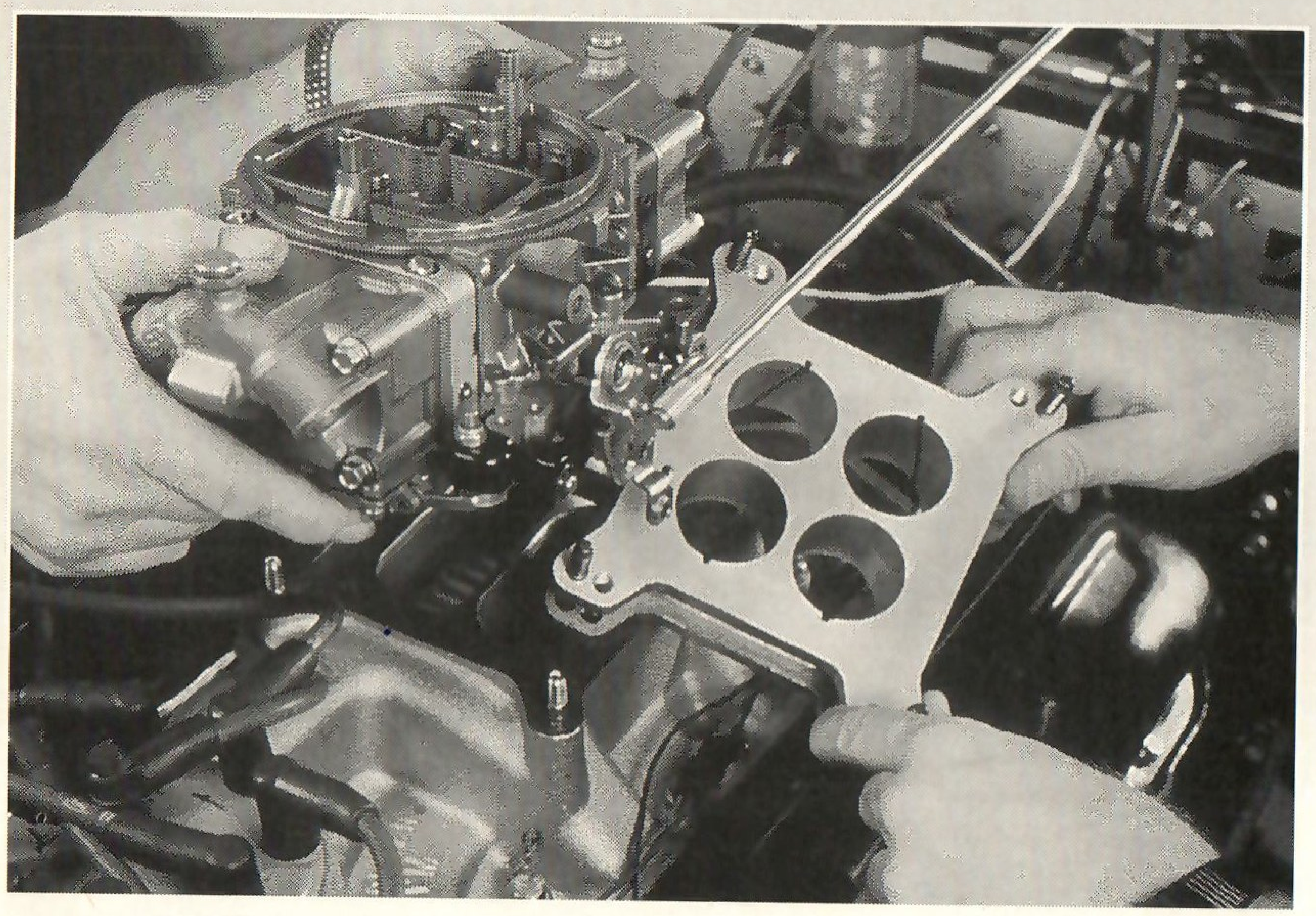
Cut-away Illustration of "Swirl Torque" Carburetor Spacer

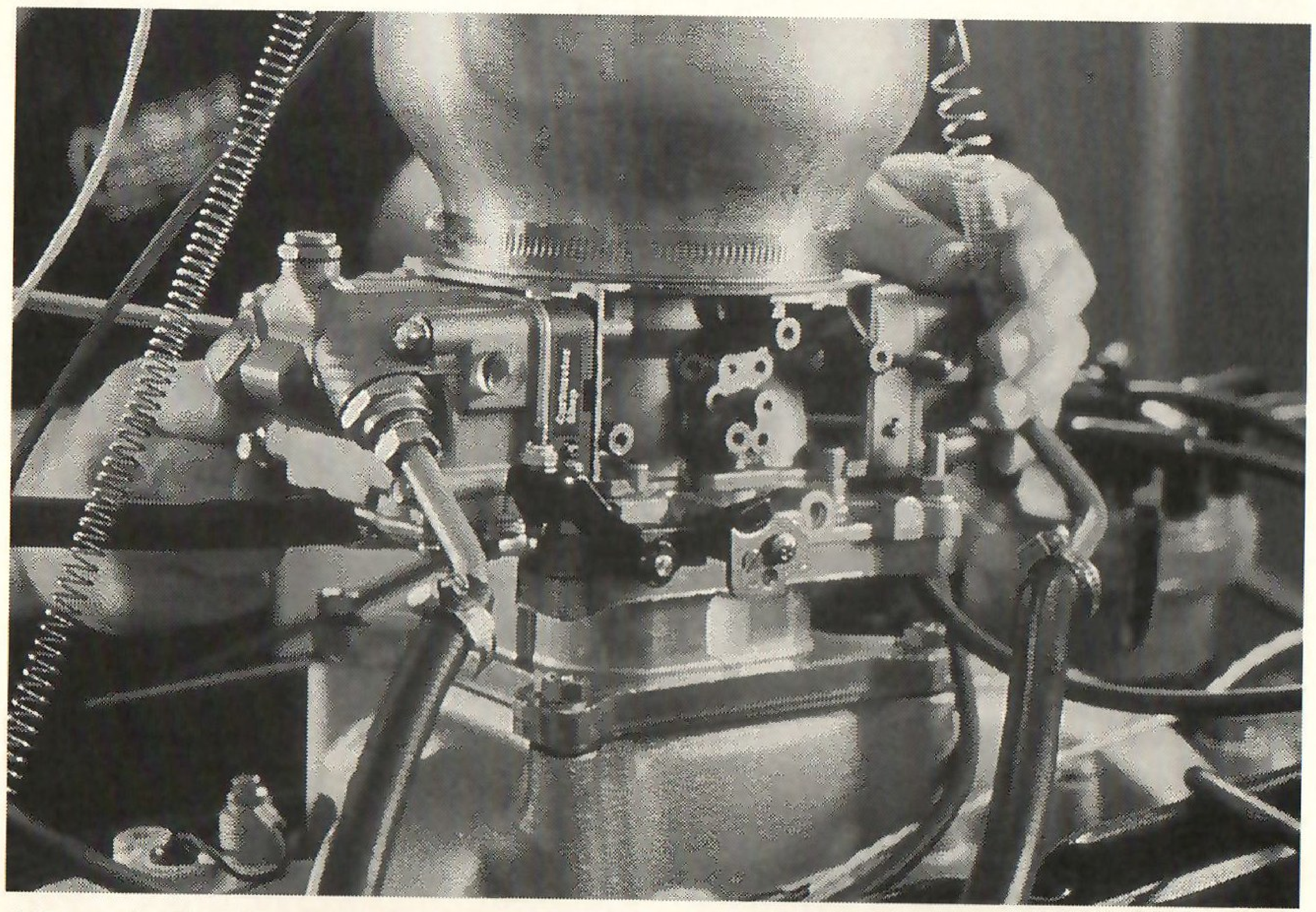


The slot is machined on an angle from the flow axis that is designed to impart motion (in a swirling fashion) to air/fuel mixtures immediately after passing through the carburetor throats. Placed (according to computer design and modeling) to improve mixture homogeneity without attending reductions in net air flow, these slots have shown improved combustion efficiency and torque output at lower engine rpm where the separation of air and fuel (due to insufficient air flow kinetic energy) is common to lost performance and fuel economy.

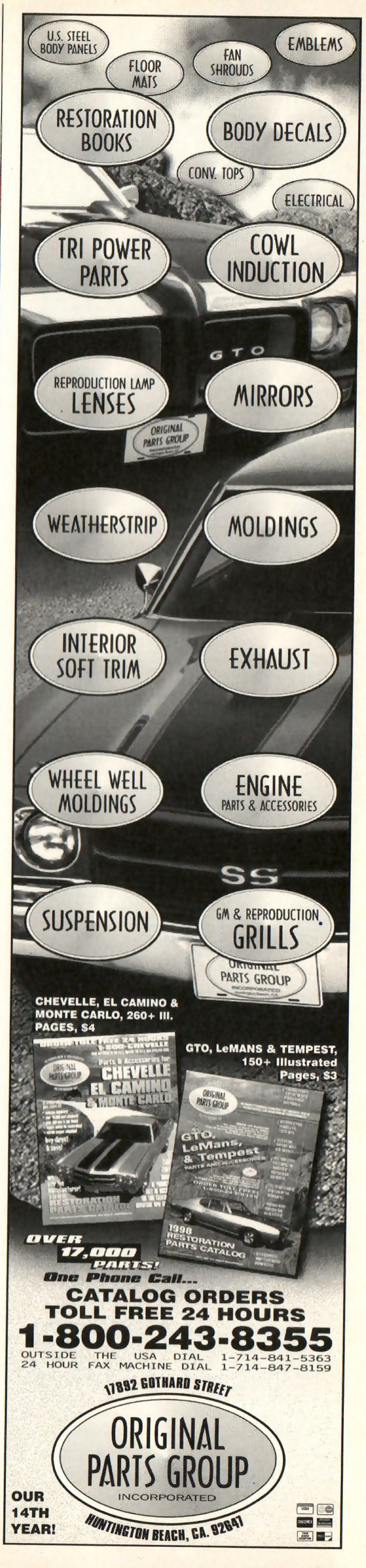


Initial tests for baseline comparisons (without the plate) were conducted on the dyno and the "Gurus of Engineering" downloaded the data for analysis.





After evaluating the data from the first series of dyno pulls, the "Swirl Torque" carburetor spacer plate was installed on our small-block Ford test mule. As shown by our charts, the test results are impressive.



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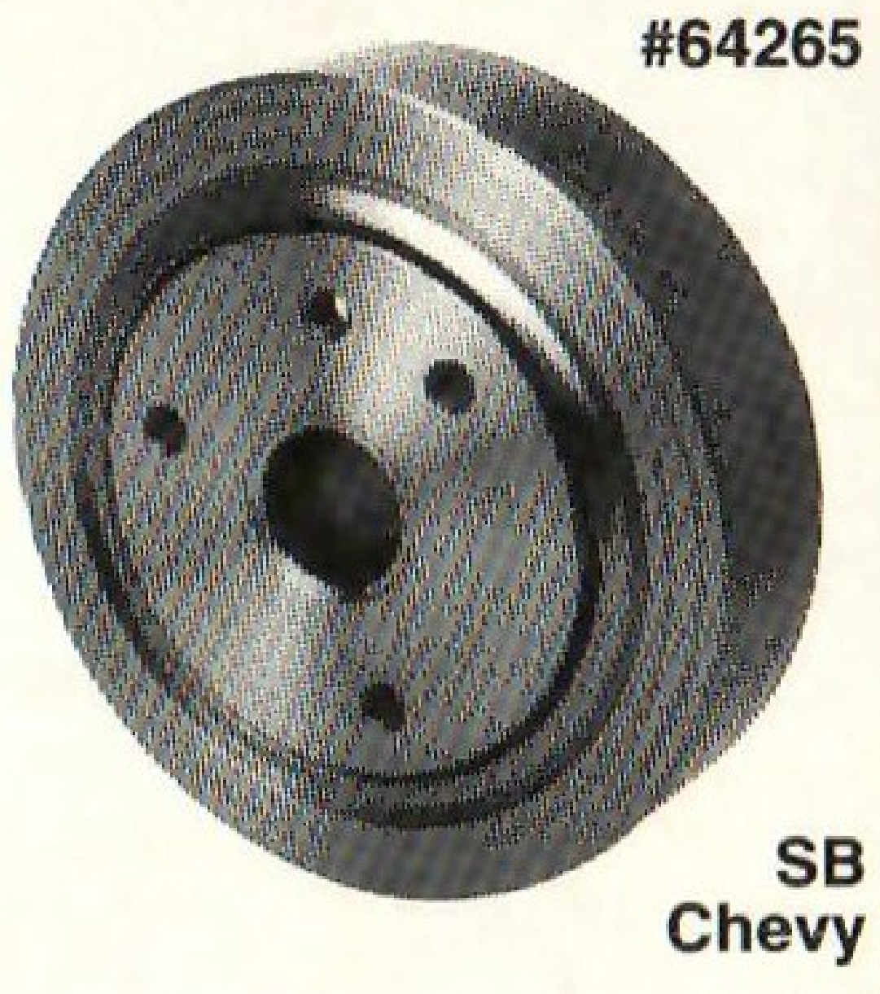
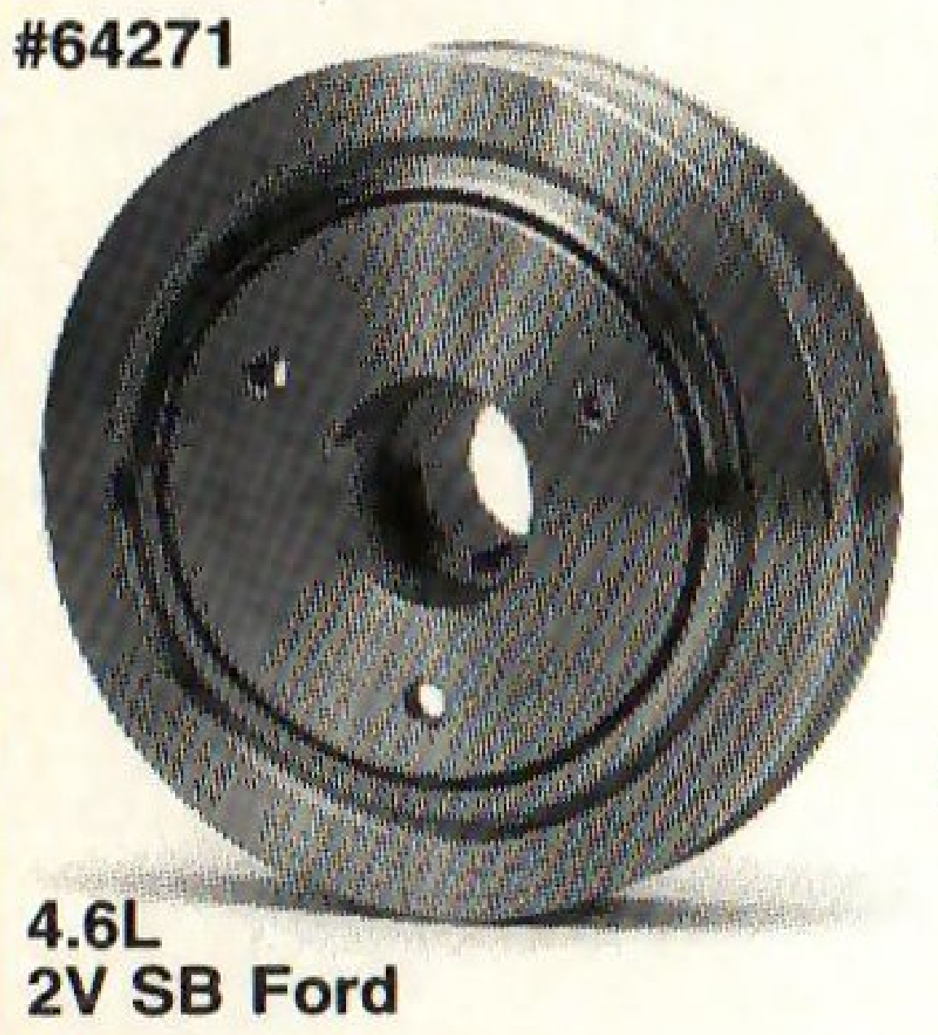


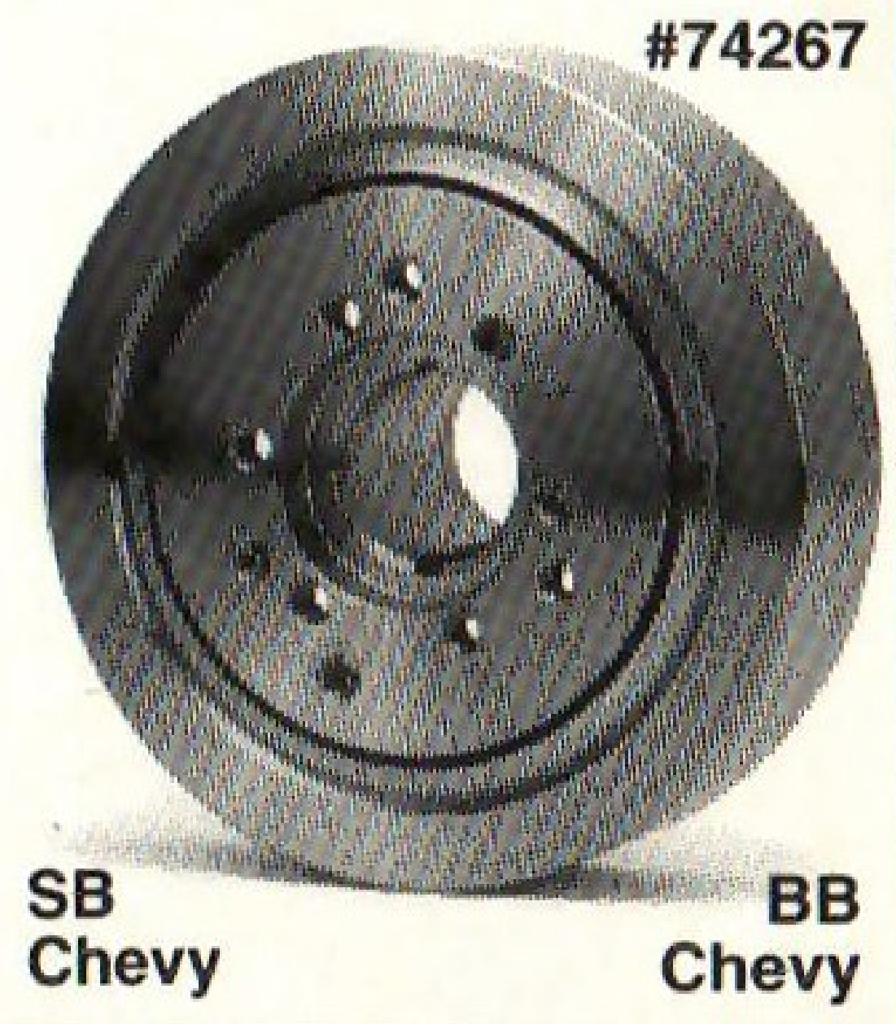


Ford Dampers

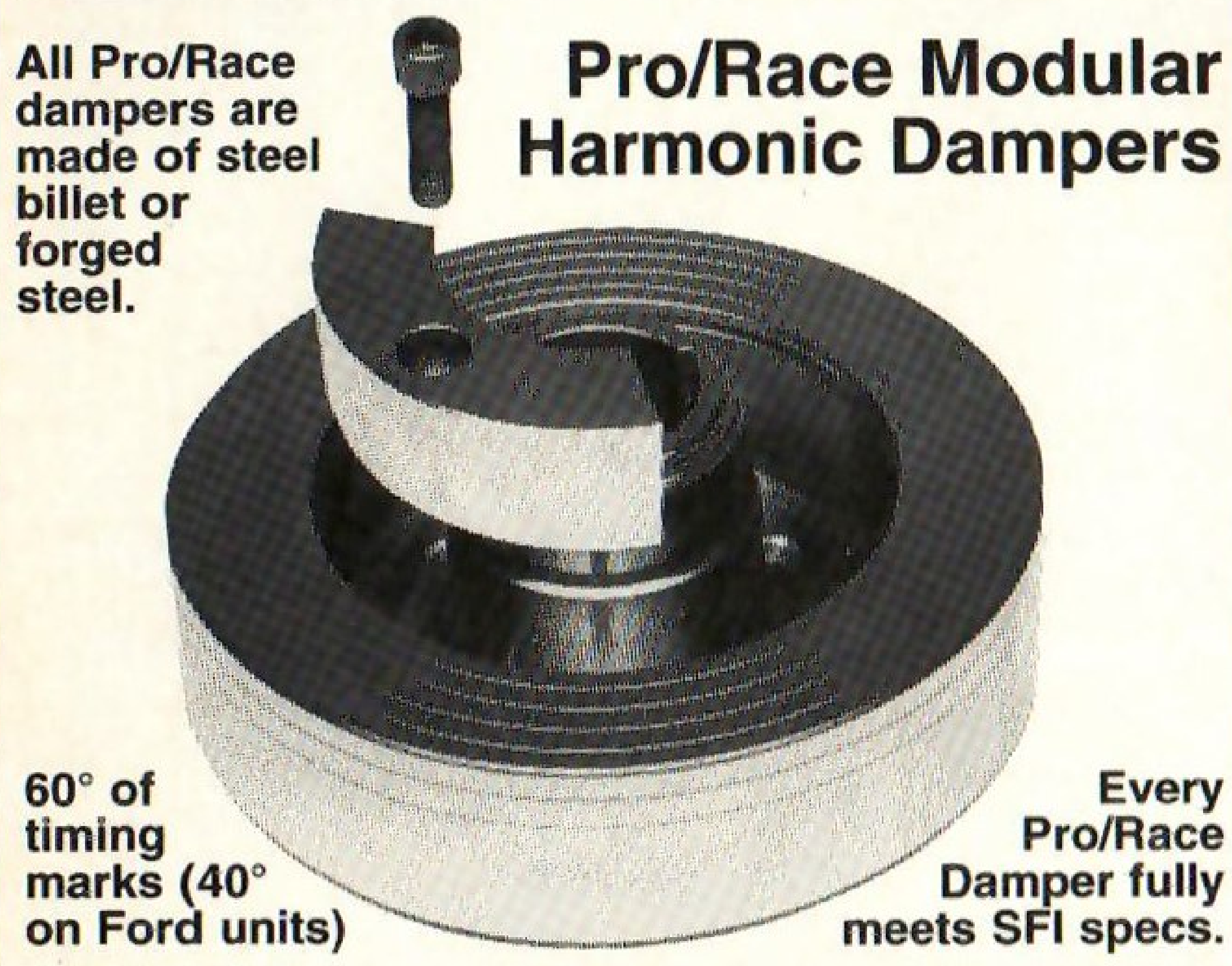
Pro/Race offers SFI-spec models for all popular Ford V8 SB and BB engines including the new 4.6L 2V modular Mustang. Most models include both 3 and 4 bolt patterns.

Dampers for Superchargers

New blower models feature dual keyways and six tapped holes to fit most blower pulleys. Makes a bulletproof installation for blown high boost engines. SFI-spec.



Pro/Race Modular Harmonic Dampers


All Pro/Race dampers are made of steel billet or forged steel.
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Pro/Race Harmonic Dampers feature a bolt-in counterweight. This means you can remove the weight from externally balanced units to create a neutral balanced damper. SB and BB Chevy and SB Chrysler weights are available separately. **Note:** Pro/Race dampers are now available at a wide range of performance retailers everywhere.

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Fri Sat Sun WEEKEND PLANNER

ALTOONA, PA — AUG 15-17

8th Kruise to the Park, Lakemont Park, all vehicles pre-'75 = Jerome Mitchell, (814) 946-9403.

SOUTH BEND, IN — AUG 16-17

9th Summer Street Machine Nationals, St. Joseph County Fairgrounds, Ford Special Events Performance Series, open to all years 2wd and trucks = Special Events, (317) 236-6522.

DENVER, CO — AUG 16-17

Super Chevy Show, Bandimere Speedway, *POPULAR HOT RODDING* Super Street Shootout, BFGoodrich Car Show, Performance Marketplace midway, drag racing, swap meet, car corral = AutoStar Productions, (800) 639-0810.

WENDOVER, UT — AUG 16-22

Speed Week, Bonneville Salt Flats, classic roadsters, coupes, new high-tech machinery and 300mph lakesters = SCTA/BNI, 2285 Tracy Avenue, Simi Valley, CA 93063-2766, (805) 526-1805.

READING, PA — AUG 17

Pontiac Drag Sports Nationals, Maple Grove Raceway, drag racing, multiple classes, various weight breaks/nitrous categories = P.D.S., (909) 783- 0866.

MANNINGTON, NJ — AUG 17

Road Knights Fun Run #4, Rainbow's End Airport, street rods, customs, classics, street machines, antiques = Rocky Demery, (609) 299-0701.

VALLEJO, CA — AUG 17

The Hot Rod Picnic, Solano County Fairgrounds, hot rods and cool customs thru '54 = Goodguys, (510) 838-9876, ext. 5.

MILWAUKEE, WI — AUG 17

16th Fall Mopar Show & Shine, Dodgeland of Wisconsin (in Franklin), car show = Wisconsin Mopar Muscle Club, Southeast Wisconsin Chapter, Rob Robison, (414) 394-9981.

SPRINGFIELD, MO — AUG 22-24

30th Swap Meet and Car Corral, Ozark Empire Fairgrounds, auto-related items, 1200 vendor spaces, pre-registration available = (417) 993-4660, Harold, (417) 883-3497.

PLEASANTON, CA — AUG 22-24

11th West Coast Nationals, Pleasanton Fairgrounds, rods, customs, and classics thru '54 = Goodguys, (510) 838-9876, ext 5.

CARLISLE, PA — AUG 22-24

Corvettes at Carlisle, Carlisle Fairgrounds, gates open at 7am daily, show, car corral, auction, flea market, aftermarket vendors = Carlisle Productions, (717) 243-7855.

VANDALIA, OH — AUG 23-24

13th Trans Am Nationals, Dayton Airport Inn, all-Pontiac car show, swap meet and vendors = (937) 233-9504, (614) 263-5506.

XENIA, OH — AUG 23

Inaugural Trans-Am Nationals Drag Race, Kil-Kare Raceway, gates open at 9am, cash and trophies, part of Dayton T/A Nats activities, free Edelbrock heads to T/A class winner = Bruce Fulper, Rock n Roll Engineering, (909) 783-0866.

STANTON, MI — AUG 23

6th Mopar Raceday, Mid Michigan Motorplex, 9am to 3pm, entries close at 1:00, all cars must be Chrysler powered, presented by Western Michigan Mopar Club = (616) 664-5595.

PALMDALE, CA — AUG 23

Nitro Under the Lights, L.A. County Raceway, ANRA Nostalgia drag racing, including front engine Top Fuel = LACR, (805) 533-2224, ANRA, (510) 229-1210.

CAMBRIDGE, OH — AUG 23

13th Clewell's Cambridge Classic Cruise-In, downtown, car and truck show, 3pm to 8pm, open to all vehicles = (614) 432-5837, days, (614) 454-0347.

LINCOLN, NH — AUG 29-SEP 1

43rd Northeast Hemi Owners Assoc. Regional Meet, the Mill at Loom Mountain, all Mopars welcome = Mike Feldman, 110 Allen Road, North Eaton, MA 02356, (508) 238-9781.

COSTA MESA, CA — AUG 30-SEP 1

15th Great Labor Day Cruise, Orange County Fairgrounds, car show, exhibits, bands, presented by the Orange County Crusin' Association = OCCA, 9242 Walker Street, Suite C, Cypress, CA 90630.

ENGLISHTOWN, NJ — AUG 30-31

8th Buick Performance Weekend, Old Bridge Township Raceway Park, all-Buick show and drag race, top name GN and 5.0 war, trophies, hosted by the N.E. chapter of GSCA = (908) 446-7800.

INDIANAPOLIS, IN — AUG 30-31

Drag Fest '97, Adam's Mark Airport Hotel, collectibles show, appearance by Mr. Norm of Grand Spaulding Dodge, display of historic drag cars = Match Race Madness, (714) 547-6004.

Material submitted to Weekend Planner will be printed as space permits. Please note: weekly/monthly cruise nights cannot be included due to the vast number of them nationwide. **Please type each notice, including location, date, address, and phone number for further information.** Submissions must be received at least 120 days before your event. Send material to: Popular Hot Rodding Weekend Planner, 774 S. Placentia Ave., Placentia, CA 92870. Popular Hot Rodding and McMullen Argus Publishing assumes no responsibility for errors in publication, and retains the rights to discontinue this column during off-season months.

GREENWOOD, IN AUG 30

Remember When, NAPA/Sam's Club lot, rods, customs, muscle cars, classics, vendors, entertainment, prizes = Rick Bartlett, (317) 784-3131.

MARION, IN AUG 30

7th Cruise-In-Fly-In Breakfast, Marion Airport, vintage cars and airplanes, sponsored by Marion High School Boosters = Ray L. Johnson, (317) 664-2588.

CEDAR PARK, TX AUG 31

GM Sunday '97, Hill County Cellars Winery, Mac's Pack, car show, awards = (512) 259-5092.

CLIO, MI AUG 31

Mopar Show and Swap Meet, Bentley High School, multiple classes, prizes, dash plaques, presented by Mid-Michigan Mopar Enthusiasts = (810) 235-1098.

SAN DIEGO, CA SEP 1

San Diego Stadium Auto Swap, Jack Murphy Stadium, car show, all vehicles, trophies and cash prizes, parts = Ray Taylor, www.carsnet.com, (619) 484-9342.

BLOOMINGTON/NORMAL, IL SEP 4-7

Mid-West Collector Car Flea Market & Corral, Interstate Center, hard to find parts, literature, and memorabilia for all types of collector cars and trucks = (717) 243-7855.

ST. LOUIS, MO SEP 5-7

12 Illinois Dodge Dealers Monster Mopar Weekend, Gateway International Raceway, full bracket program, special "Mopars vs. The World" heads up program, car show = S.S. Promotions, (314) 938-6625.

DALLAS, TX SEP 5-7

21st Shelby Texas Nationals, Texas Motorplex in Ennis, drag racing, autocross, car show, benefit for Carroll Shelby's Children's Foundation = Shelby Cobra Association of Texas, (972) 475-1294.

CIRCLEVILLE, PA SEP 6

Cruise In '97, 5 miles west of PA Turnpike Exit 7, 3pm to 9pm, cruise at 6pm, dash plaques & goody bags for first 100 entries, vendors, food = Greg Timko, (412) 864-4902.

POMONA, CA SEP 7

Pomona Swap Meet, Fairplex, 5am-3pm, West Coast's largest auto swap meet and car show, vendors = George Cross & Sons, (714) 544-7004.

(Continued on page 96)

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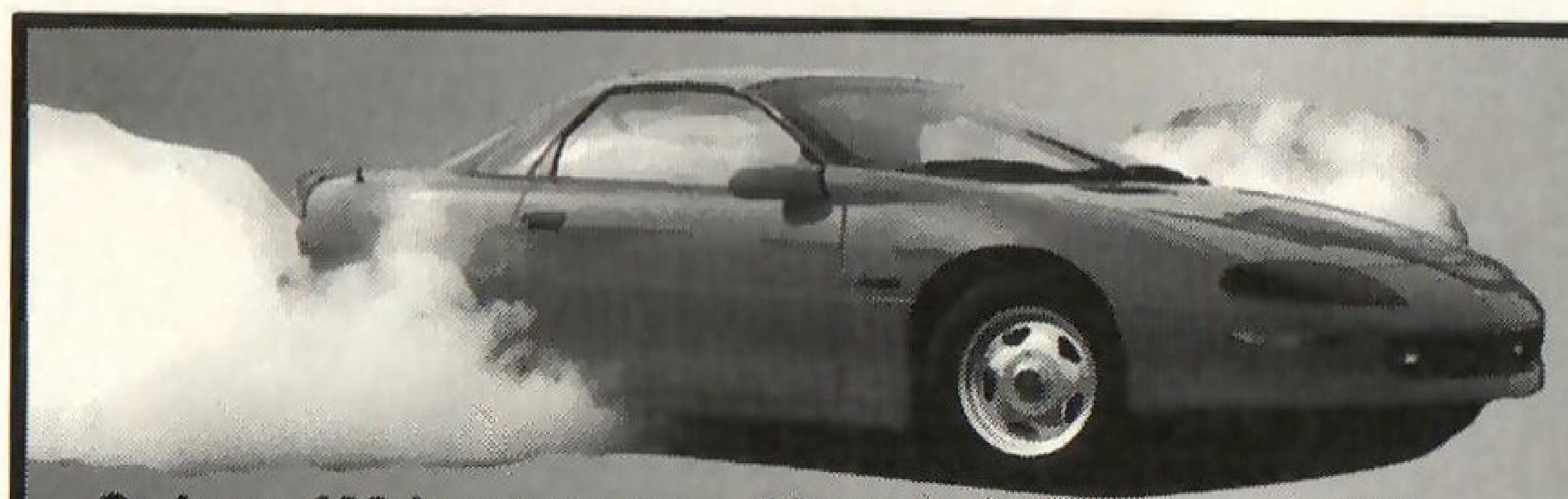

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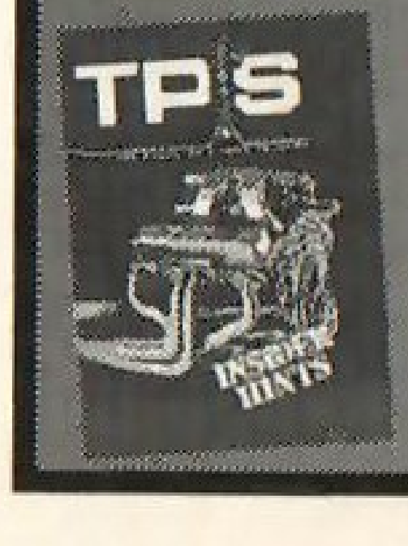

Fri Sat Sun WEEKEND PLANNER

(Continued from page 94)

ZANESVILLE, OH SEP 7

13th County Fair Cruise In, Coutry Fair Shopping Center, 11am to 4pm, car and truck show, = send S.A.S.E. to Y-City Custom Car Association, 2090 Shady Lane, Zanesville, OH 43701.

ROCHESTER, MI SEP 13-14

1st Goodguys Motor City Nationals, Meadow Brook Grounds, car show, swap meet, rods, customs, and classics thru '72 = Goodguys, (510) 838-9876, ext. 5.

BUENA PARK, CA SEP 14

Motorsports Collectible & Card Show, Holiday Inn, 91 & Beach Blvd., 8am to 2pm, free postcard with paid admission = MC Promotions, (801) 879-2011.

CANANDAIGUA, NY SEP 14

Bristol Hills Fall Classic Car Show, Bristol Mountain Ski Area, all vehicles, free spectator admission, vendors = (716) 229-5293, (716) 394-2670.

McCONNELSVILLE, OH SEP 14

14th M&M Jaycees Fall Festival Auto & Truck Show, Morgan County Fairgrounds, 11am to 4pm, swap meet, vendors = send S.A.S.E. to Walter Dalzell, 10160 Dalzell Rd NW, Crooksville, OH 43731.

WILDWOODS, NJ SEP 18-24

4th Boardwalk Classics, on the Boardwalk, all cars thru '72 (plus special interests), hosted by New Jersey Hot Rod Association = Chick Bell, (609) 589-2422.

SAN BERNARDINO, CA SEP 18-21

8th Route 66 Rendezvous, historic Downtown, car show, pre-'73 vehicles, Cruzin' Hall of Fame induction = San Bernardino Convention & Visitors Bureau, (800) TO-RTE-66 or (909) 889-3980.

MEMPHIS, TN SEP 19-21

NMCA Flowmaster Fastest Street Car Shootout Finals, Memphis Motorsports Park, presented by POPULAR HOT RODDING, street-legal drag racing, Cragar Car show = National Muscle Car Association, (901) 365-3779.

RHINEBECK, NY SEP 19-21

6th Goodguys East Coast Nationals, Dutchess County Fairgrounds, Rods, Customs, and Classics thru '62 = Goodguys, (510) 838-9876, ext. 5.

SPRINGFIELD, MO SEP 19-21

9th Fall Street Machine Nationals, Ozark Empire Fairgrounds, all years of 2wd cars and trucks = Special Events, (317) 236-6522.

ROCKINGHAM, NC SEP 20-21

Super Chevy Show, Rockingham Dragway, *POPULAR HOT RODDING* Super Street Shootout, BFGoodrich Car Show, Performance Marketplace midway, drag racing, swap meet, car corral = AutoStar Productions, (800) 639-0810.

ATLANTA, GA SEP 20-21

Nopi Nationals, Lakewood Exhibition Center, International Car and Truck Show, 250 classes for all vehicles, cash and prizes, swap meet, car corral = (800) 277-NOPI.

CHULA VISTA, CA SEP 20

7th Harbor Day Car Show, J Street Marina, open to all vehicles, trophies, win a '65 Mustang, benefits to charities = South Bay Cruisers Car Club, P.O. Box 6455, Chula Vista, CA 91909-6455.

ST. PETER, MN SEP 21

21st Car Show and Swap Meet, Nicollet County Fairgrounds, all vehicles, free show car registration, presented by Auto Restorers Club of Southern Minnesota = Gary Derner, (507) 625-9226.

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BELOIT, WI SEP 21

21st Beloit Autorama, Beloit Evening Lions Club, car show, parts swap, car corral, presented Coachman Street Rod Club and Blue Ribbon Classic Chevy Club = Joe Chamberlain, 815-623-7066.

PUEBLO, CO SEP 21

5th Muscle Car Shootout, Pueblo Motor Sport Park, drag race, car show, all muscle cars welcome, special Viper event, presented by the Rock Mountain Buick Gran Sport Club = Peter Tomka, (303) 279-7103.

MILWAUKEE, WI SEP 21

16th All Mopar Fall Swap Meet, The Schwabenhof, 147th & Silver Spring, presented by the Wisconsin Mopar Muscle Club, Southeast Wisconsin chapter = Mark Dietrich, (414) 475-7656, Gary Schultz, (414) 873-2404.

FREDERICK, MD SEP 21

5th Car & Truck Show, Frederick Community College, 10am to 4pm, open to all vehicles, auction, benefit for Alzheimers Association, presented by Maryland Classic Chevy Club = (301) 865-5270, (301) 829-0171.

ENGLISHTOWN, NJ SEP 26-28

21st Fall Englishtown Swap Meet and Auto Show, Old Bridge Township Raceway Park, rods, customs, and trucks on Saturday, antiques and classics on Sunday, presented by North Shore Antique Auto Club of New Jersey = Raceway Park, (908) 446-7800.

FORT WORTH, TX SEP 26-28

5th Goodguys Lone Star Nationals, Texas Motor Speedway, car show, swap meet, rods, customs, classics thru '72 = Goodguys, (510) 838-9876, ext. 5.

COMMERCE, GA SEP 27-28

Truckin' Expo, Atlanta Dragway, BFGoodrich Car Show, Performance Marketplace midway, drag racing, swap meet, car corral = AutoStar Productions, (800) 639-0810.

NEWARK, OH SEP 27

8th Old Car and Truck Show, downtown Newark, part of "Buckeye Flint Festival," 11am to 4pm, open to all pre-'73 vehicles = send S.A.S.E. to Buckeye Motorcar Club, Lew Claggett, P.O. Box 128, Newark, OH 43055.

SAN DIEGO, CA SEP 27

San Diego Stadium Auto Swap, Jack Murphy Stadium, car show, all vehicles, trophies and cash prizes, parts = Ray Taylor, www.carsnet.com, (619) 484-9342.

WAYNE, NJ SEP 28

2nd Antique/Classic Car Show, Mothers Parking lot, 1056 Route 23 North, 9am to 12pm registration, car corral, vendors, cars and trucks 20 years and older = Tri County Chamber of Commerce, (201) 831-9112.

HAGERSTOWN, MD SEP 28

All Ford and Mustang Fall Spectacular Show, Mason Dixon Dragway, 9am to 3pm, drag racing, vendors, swap meet, hosted by the Mid-Maryland Ford Club = Mike Smith, (301) 663-6903, track, (301) 791-5193.

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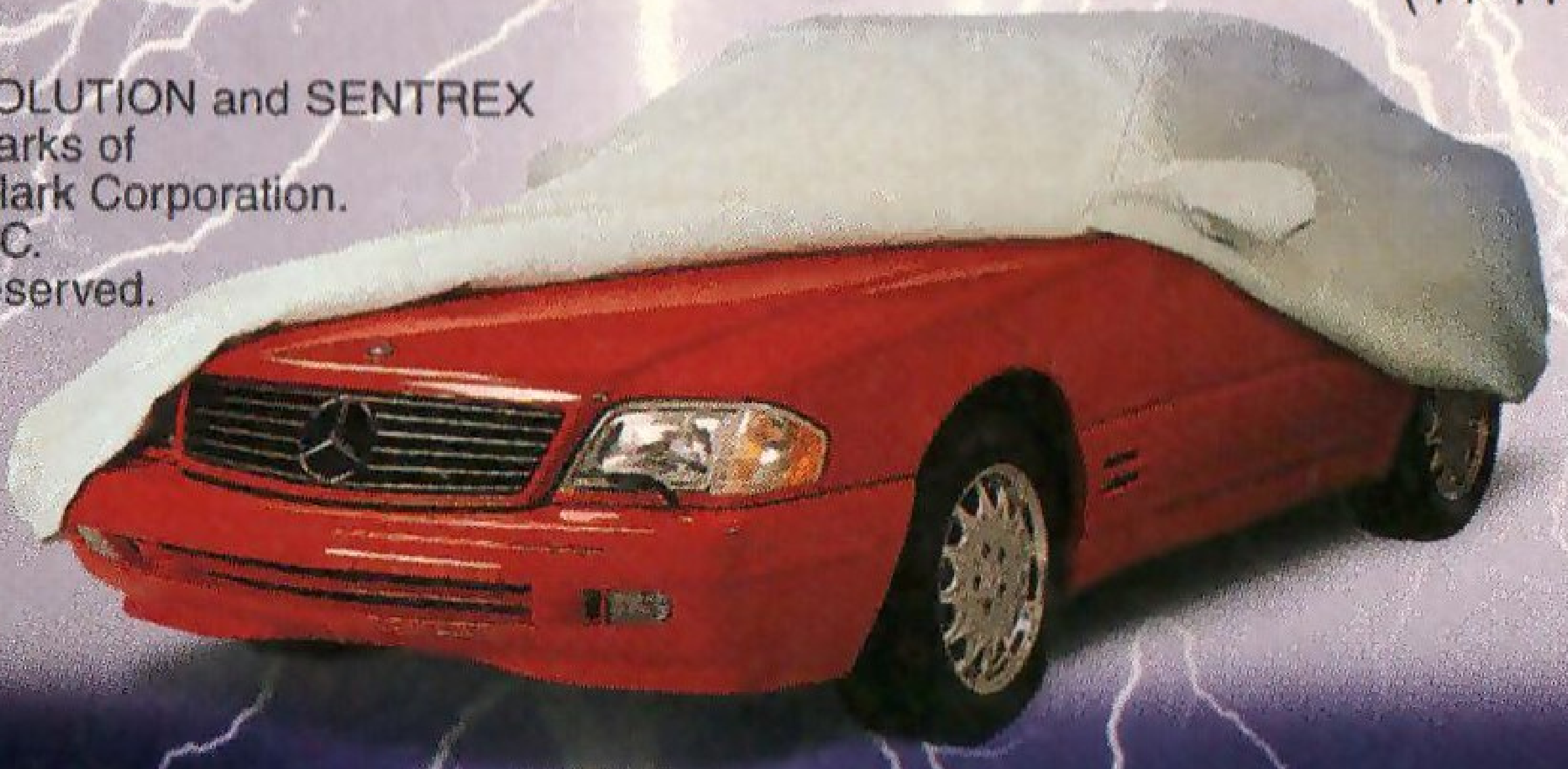

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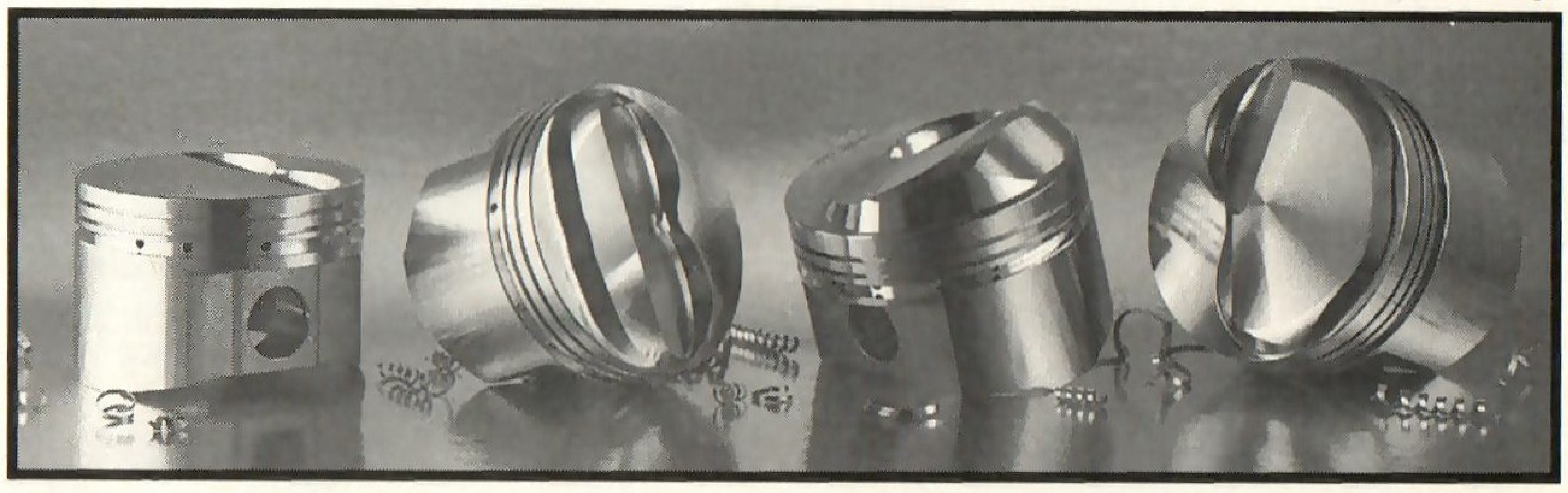

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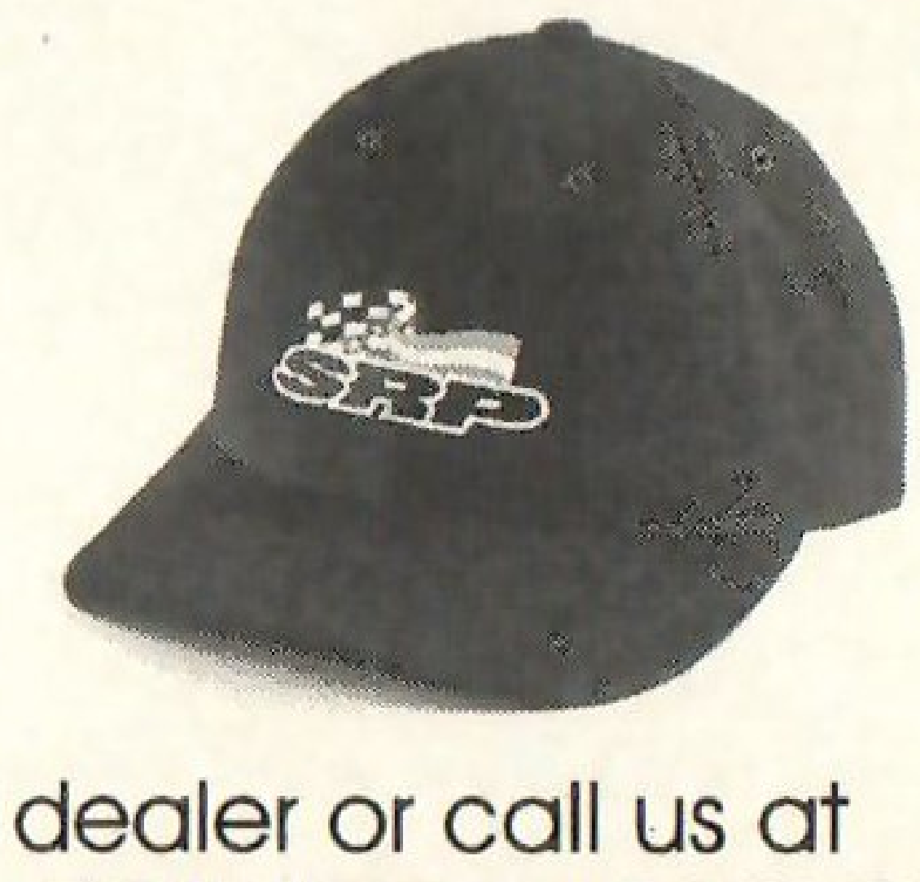

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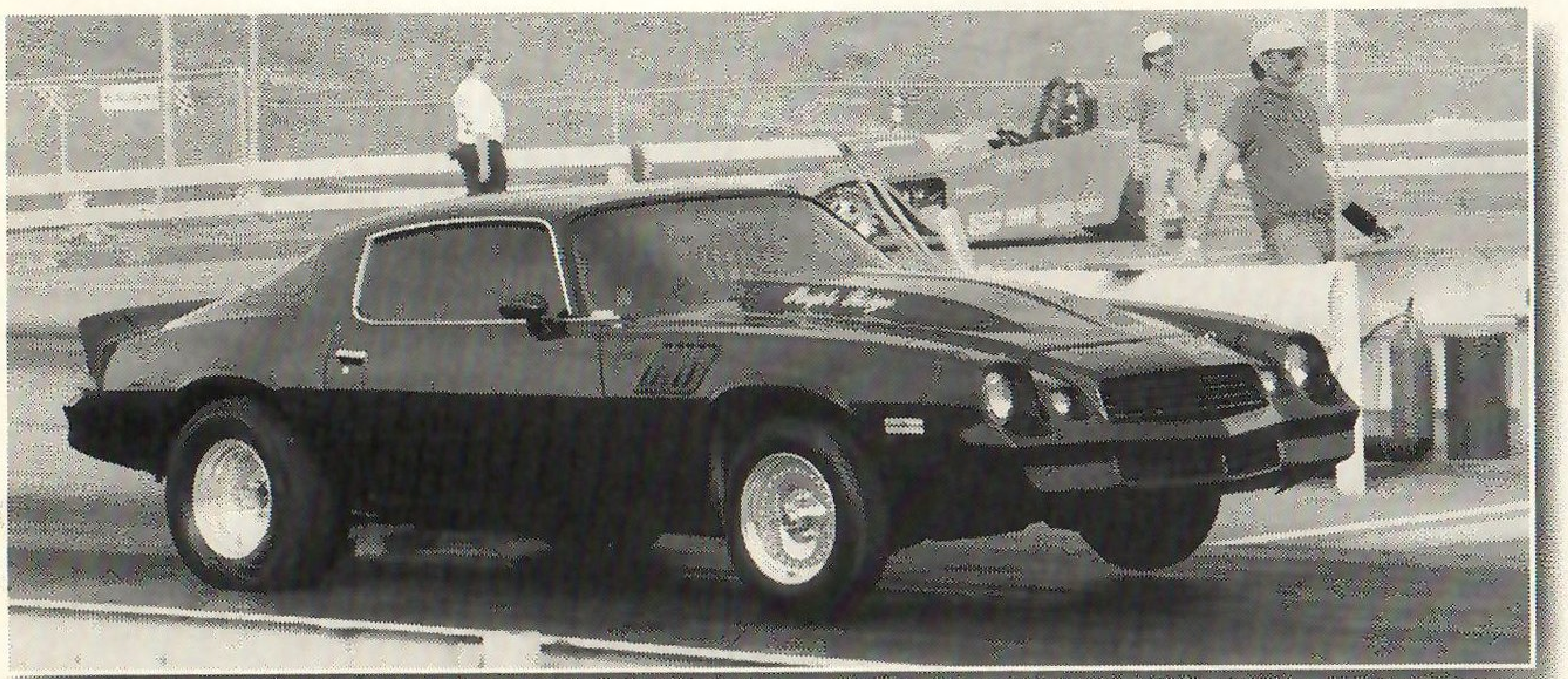
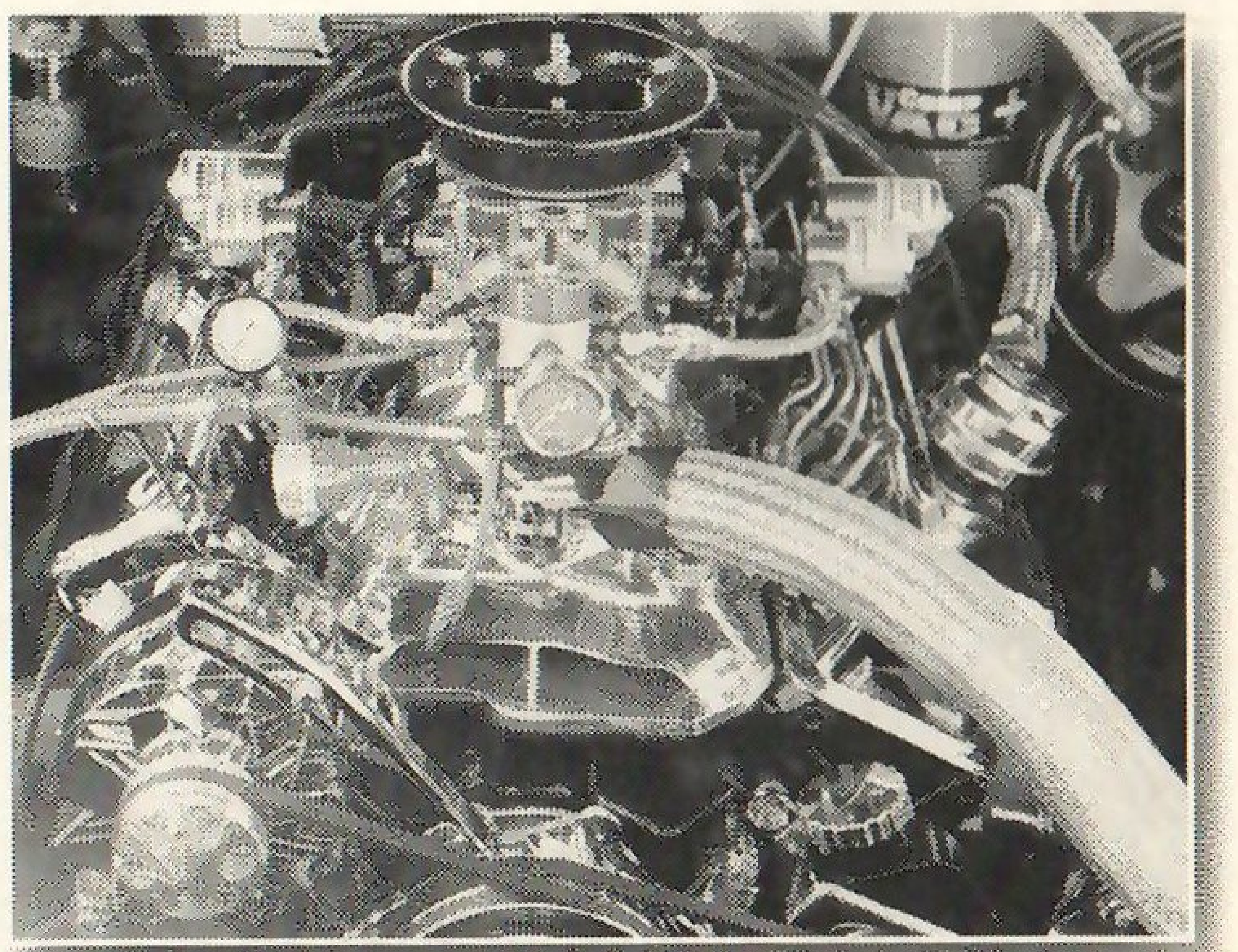
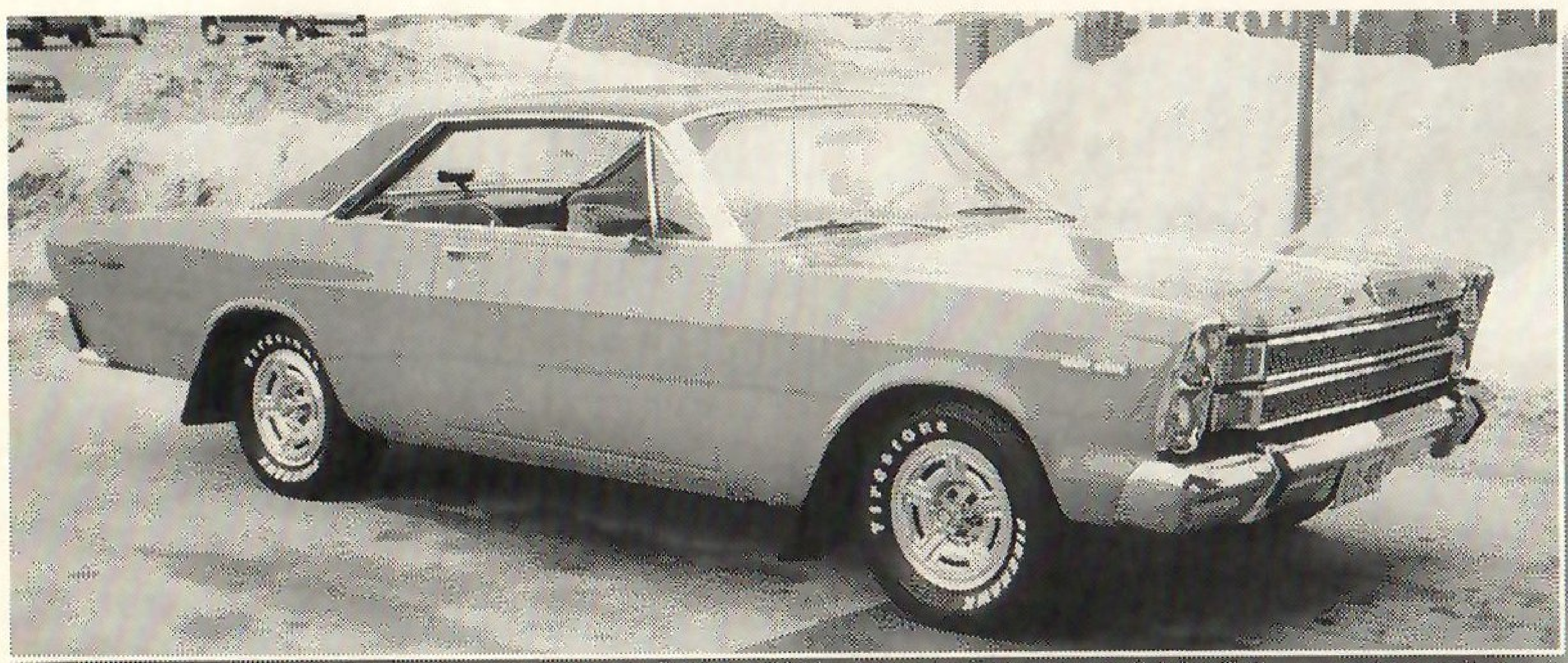




Though the guys at Brothers 3 Garage in Cypress, California, call this '79 Camaro "Purple Reign," we can't figure out why — it looks black from the pictures. Cypress Auto Body painted it, so maybe we should ask them. Harold, Jerry, and Randy Wold each put their share of time into this Z-28, and a time slip proving a lap of 10.59 at 130mph shows their work was in the right places. A 434 (which, by the way, is a small-block Chevy bored and stroked to its biggest proportions) was their choice of power sources, and it should hold up. How's this for a street/strip combo: A Cola 4-inch 4340 crank, iron World Products Sportsman II heads, a Dart Wilson manifold, a .630-lift Comp Cams bumpstick, and JE 12.5:1 pistons. Pour some high-octane fuel, pump up the nitrous shot, and this 3,700-pound beast could rule any block.

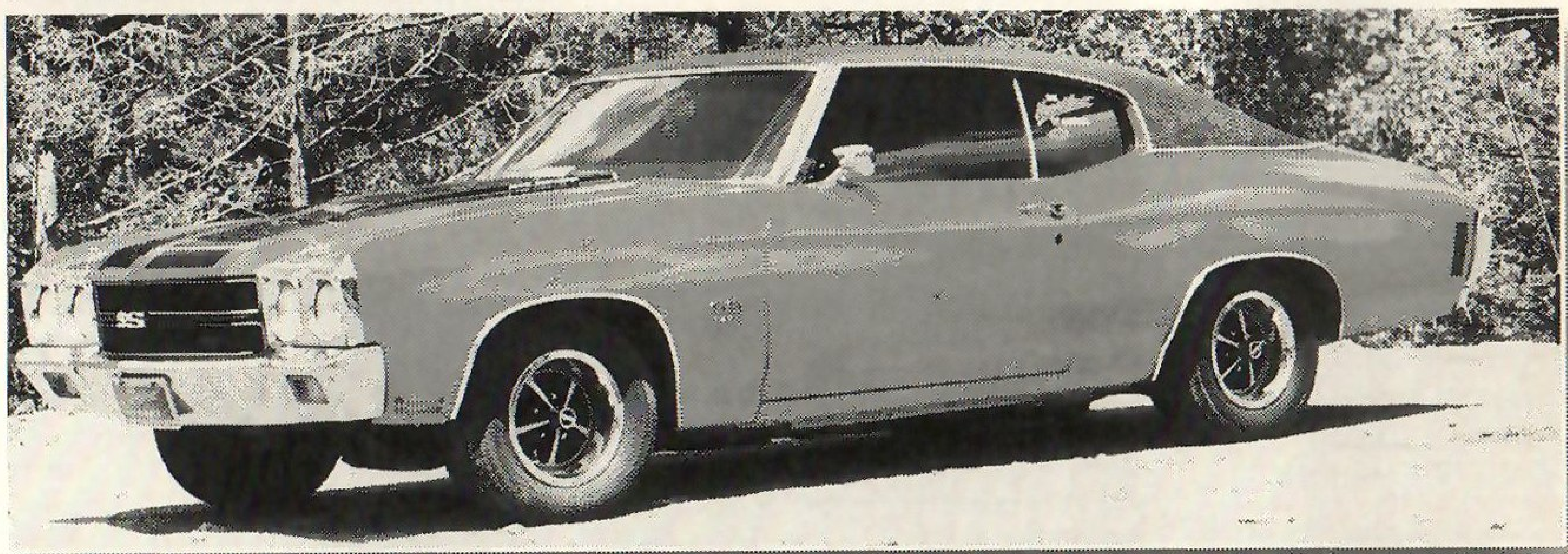
Okay, drag fans — where's the photo shot? Looks a bit like Carlsbad to us.

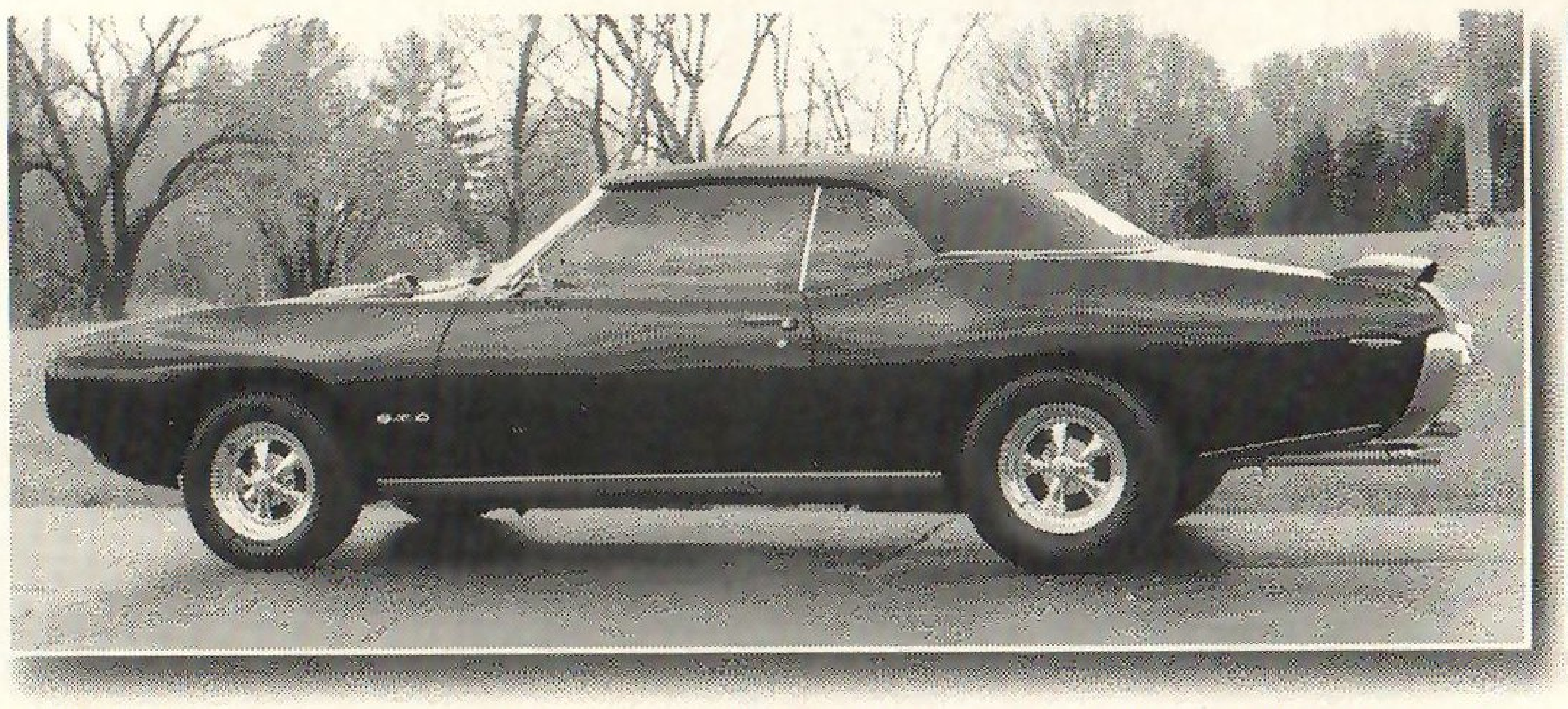


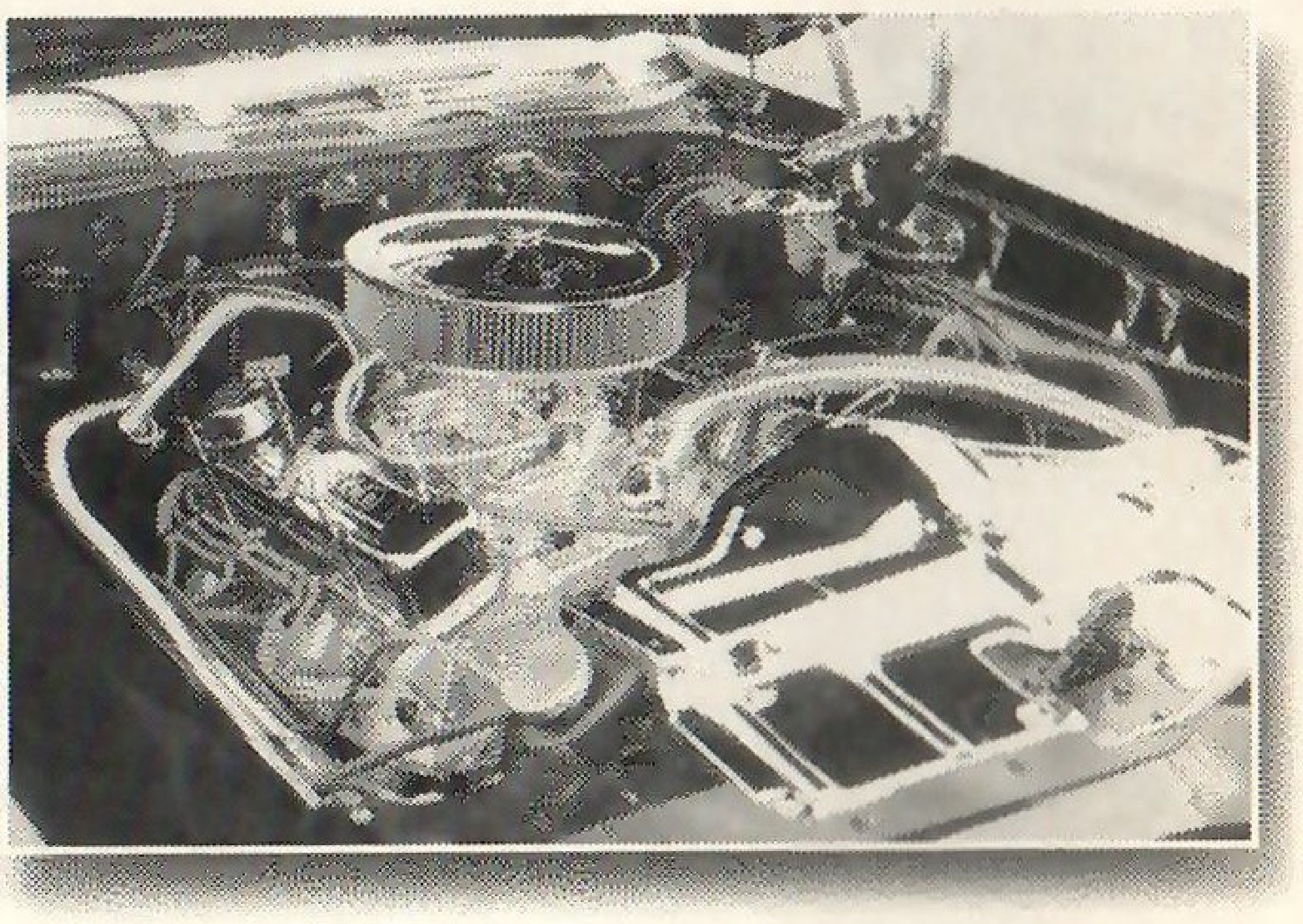
Jamey and Frank Jahner completed a father-and-son project that's second to few, but they don't drive it much. Usually, we'd go off on a crazy tirade about trailer queens and fairgrounds wusses, but considering the background in their picture, we understand the predicament. It seems the Jahners built their '66 Ford Galaxie 500 in North Dakota, and this picture was taken in July. We're kidding, of course — but, you get the point.

Isn't this two-door hardtop fantastic? It's powered by the original 428 and they've owned it since 1978. Now, son Jamey holds the keys, and we're betting he's got the itch to get it out on the road now that the salt is gone. Put that factory equipment to the test!

Few have accused Chevy of copying Ford in the styling department, but when you look at the color coding of Michael Herrera's '70 Chevelle compared to the Jahner Galaxie, there's a little resemblance. (No letters, please.) Mike's the second owner of this SS396, and he bought it in high school for $35! Though it took him 14 years to get it into this condition, he says it was worth the wait.

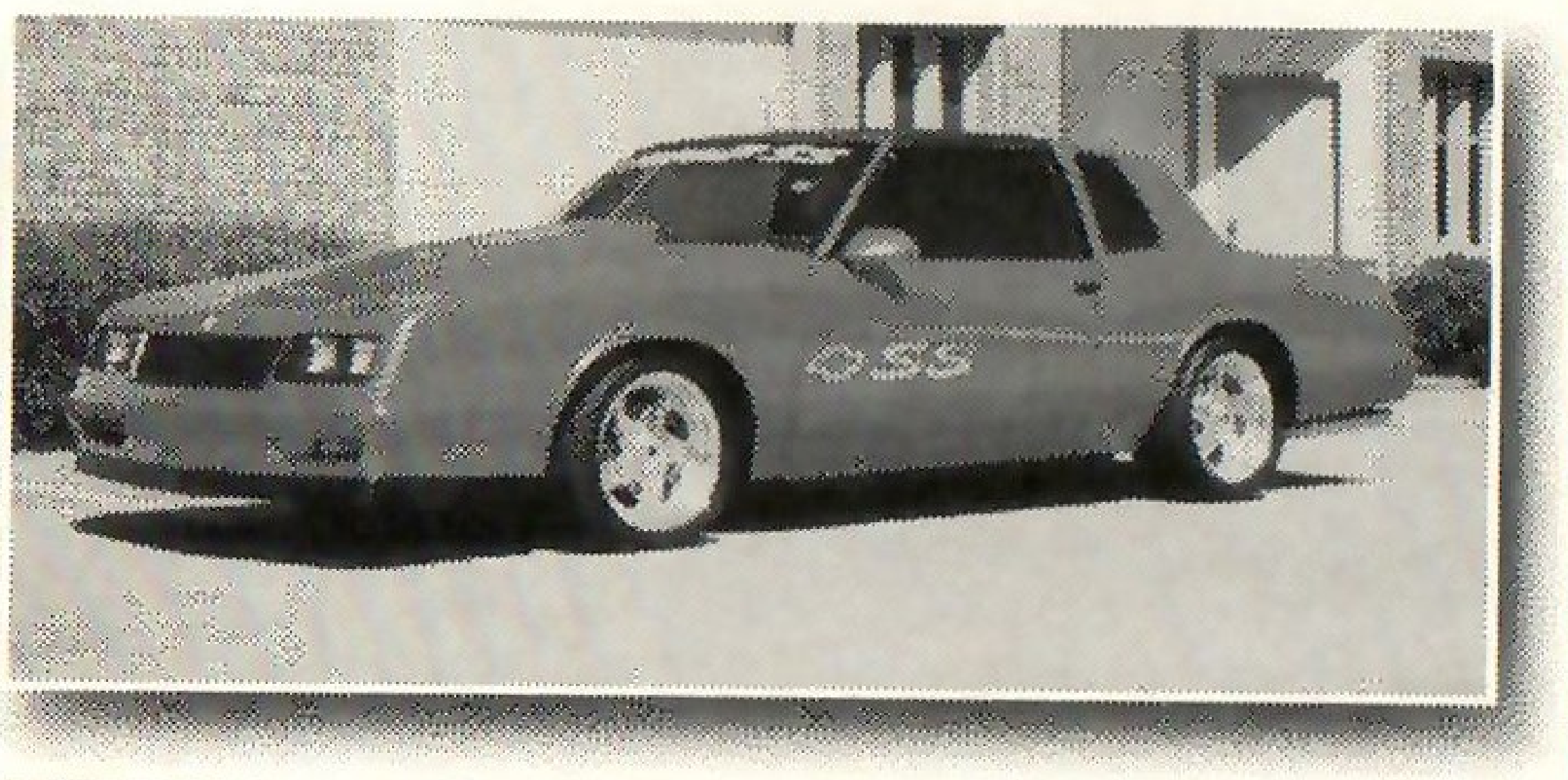






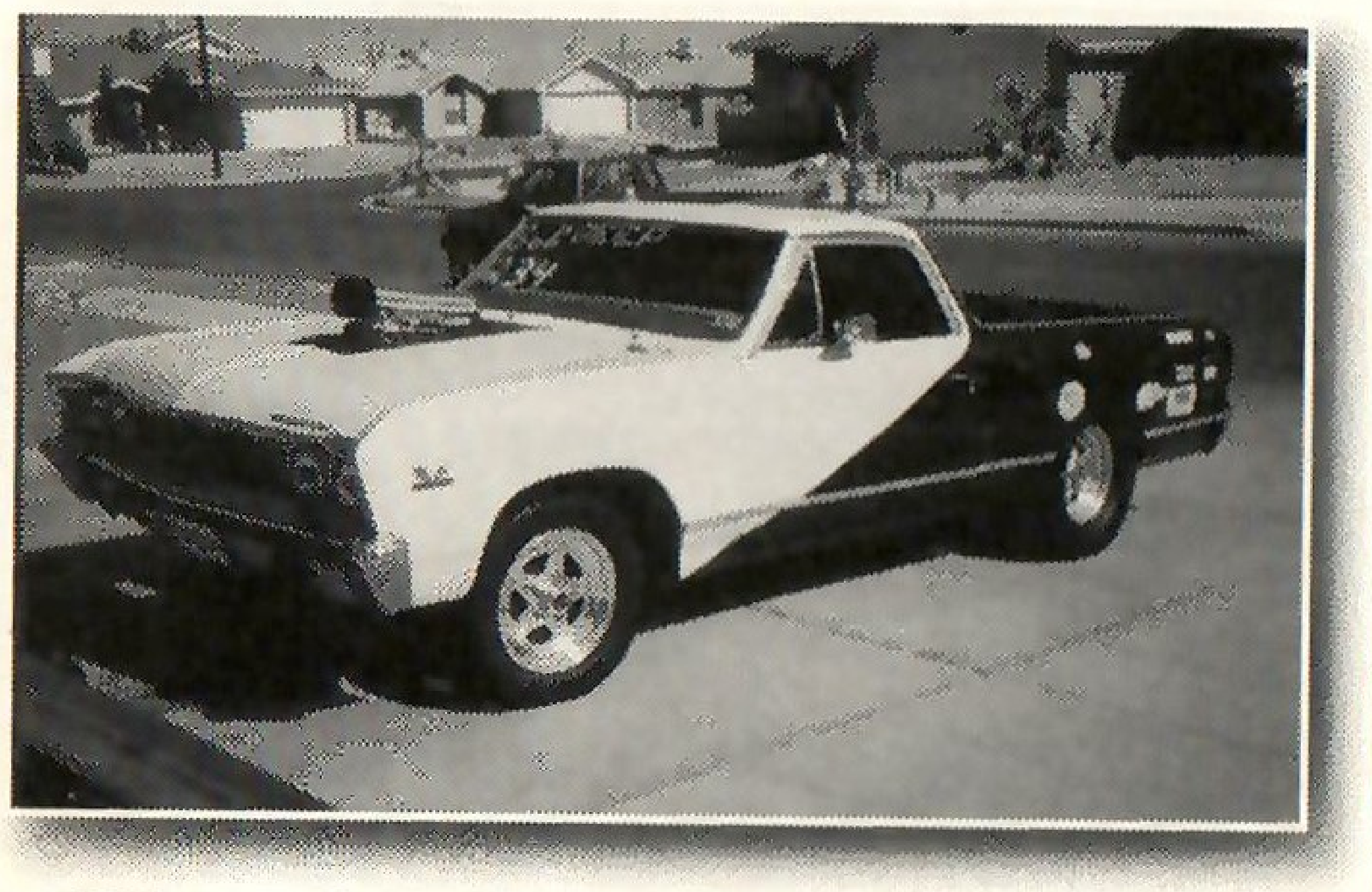
Here's the prize winner (actually, we don't give out a prize, but you get the point). How about this '69 Pontiac GTO convertible? We're talking matching numbers, *PHS* documentation, frame-on restoration, the works. Chuck Miller, of Mundelein, Illinois, admits to using a '97 Ford purple-with-silver metal flake for paint, but the look is outstanding and who cares if it isn't OEM. He took the same attitude with the 400 rebuild, using the best in Federal Mogul engine parts, plus a full Edelbrock Performer system (including the outstanding new Pontiac heads, of course).

A dual gate shifter out of a '68 works with a TH400 and a B&M Holeshot converter, and....wait a minute. This thing's feature material. Let's call this guy!

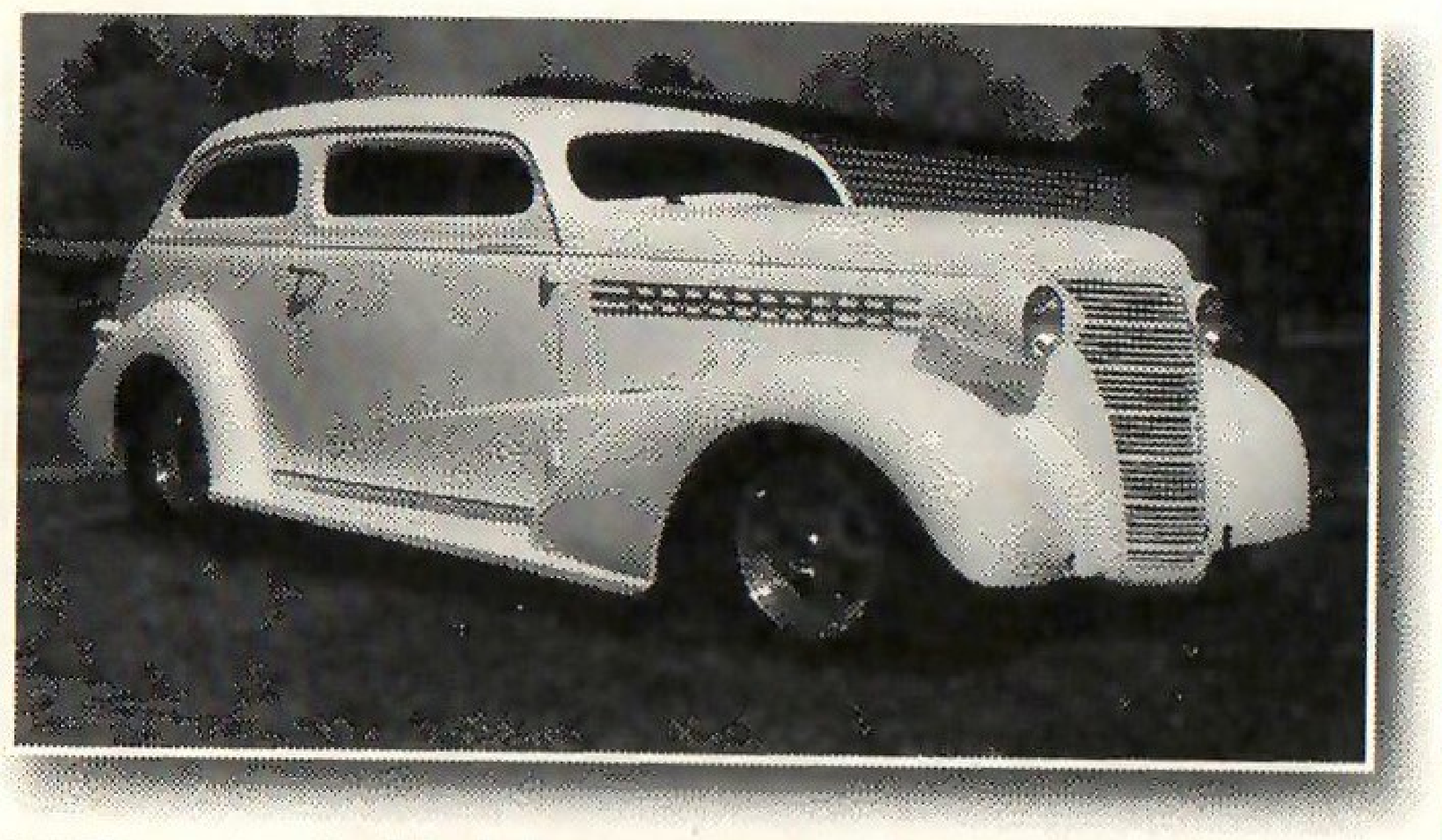


This guy begged us to run his car in color. Sorry, Robledo Red, Jr., of Goose Creek, South Carolina. But, the advertisers used it all up! Robledo put much time and thought into his custom mix of DuPont Watermelon and Strawberry, and from the color snapshot he sent, it looks great. Trust us.

His '86 Monte Carlo SS has got some other nice touches, too, including a Harwood cowl-induction hood, 17-inch GT Stingray 5s from Billet Specialties, stereo stuff from Soundstream, and 145,000 miles on the original 305. No one will accuse Red of not driving his Monte! Sorry about the lack of color, Mr. Red, but keep in touch and let us know how the 383 swap goes.



Greg Chenault lives by the saying, "Don't bury them, build them." The El Paso native took it to heart by resurrecting this '67 El Camino in 1980. It was completely totaled, but he brought it back with a 406 small block and 4.56:1 gears for a weekly warrior that runs in the low 12s. Good job, Greg.



Robert McAdams and his buddy, Mark, found this '38 Chevy in Illinois. They figured it would appreciate a warmer climate, so they brought it home with them to Shreveport, Louisiana. They got a little too used to its stock stance, so they gave it a full Pro Street treatment by adding a small-block Chevy, chopping the top, tubbing the body, and including a 9-inch rear. The story might sound simple, but that's how they tell it.

"Please put it in your magazine," Robert wrote. Thanks, we just did.

(Continued on page 100)

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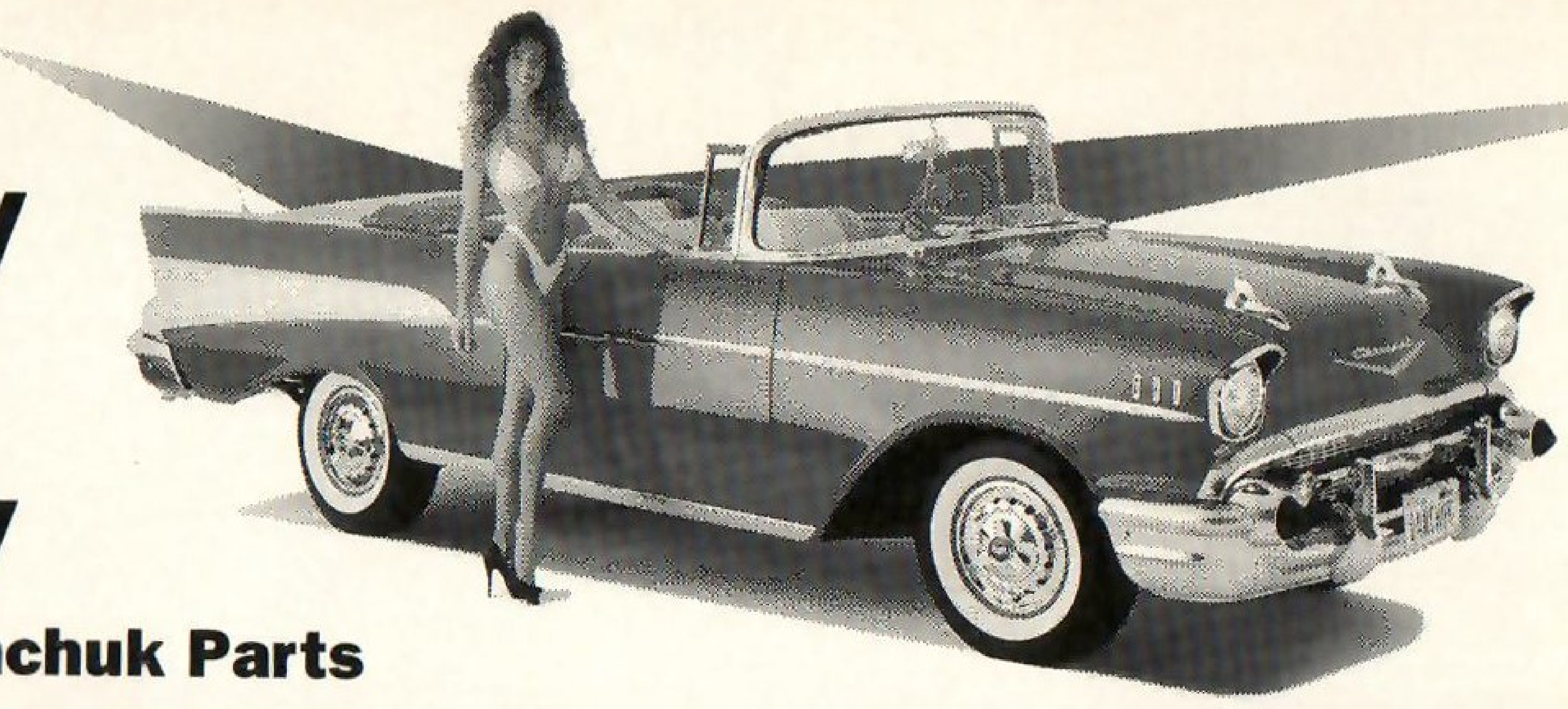

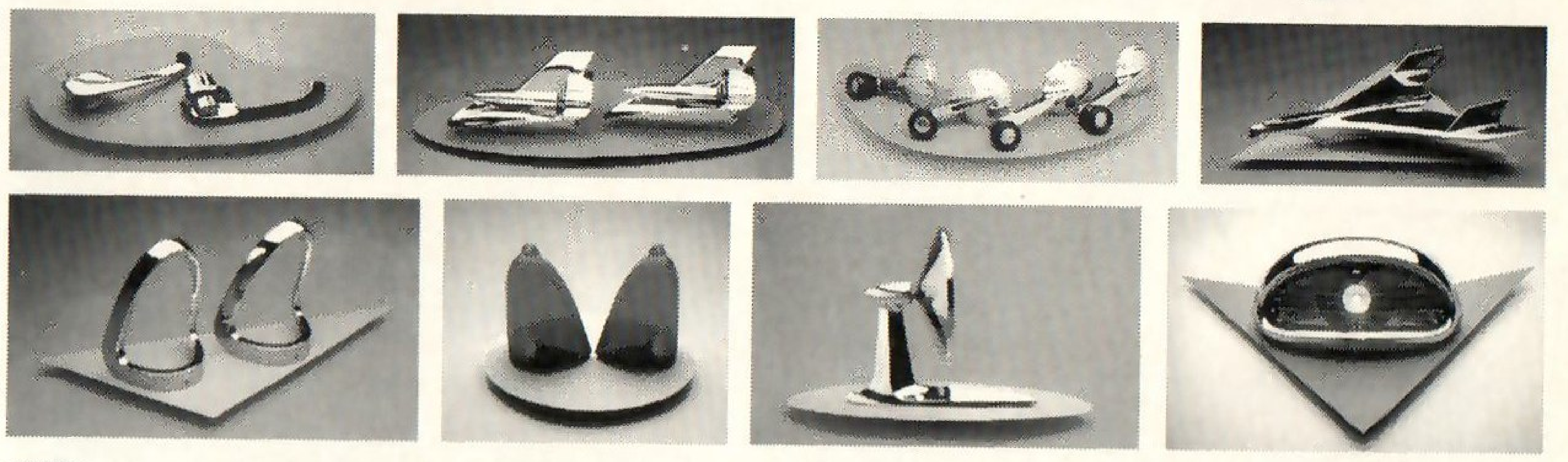

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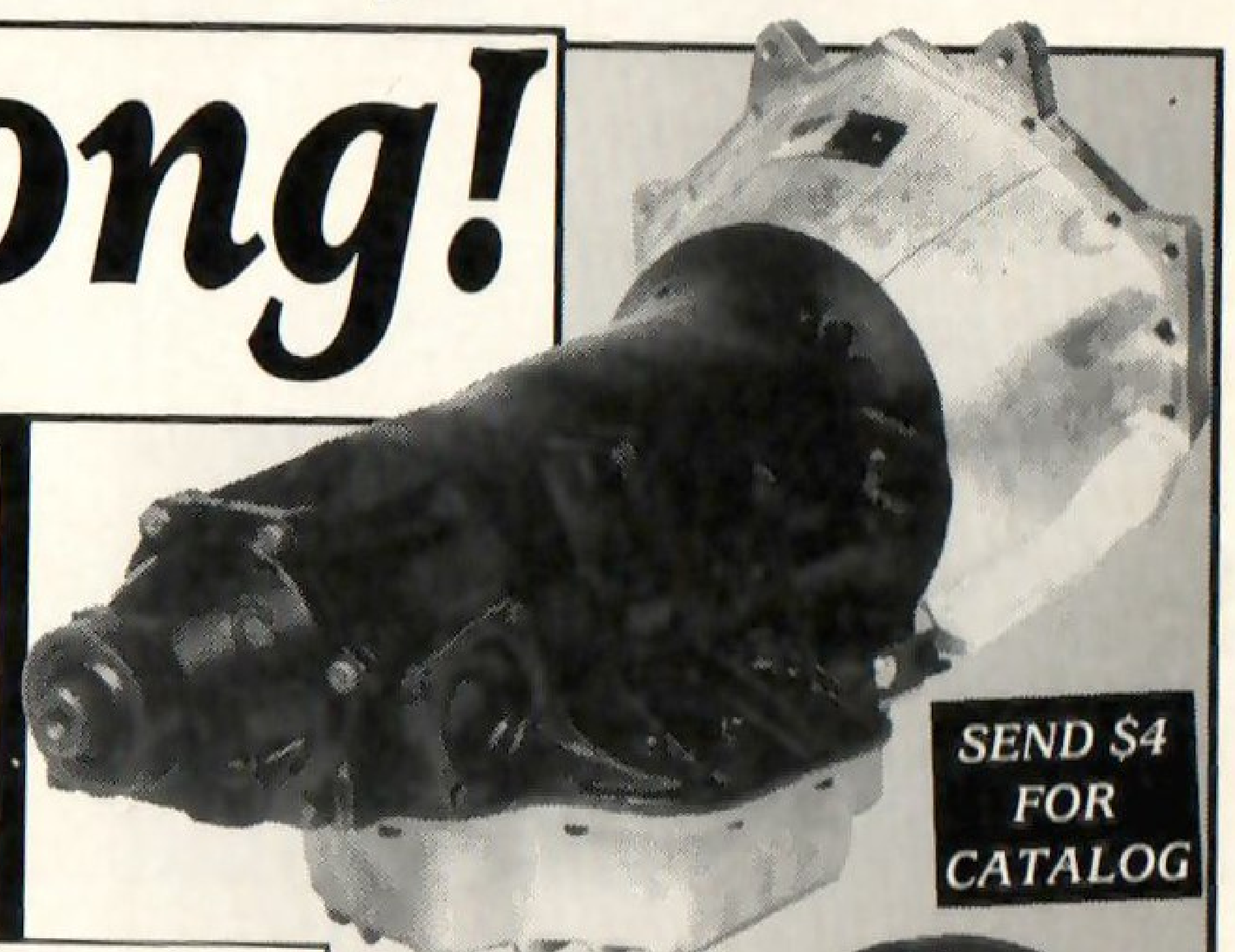

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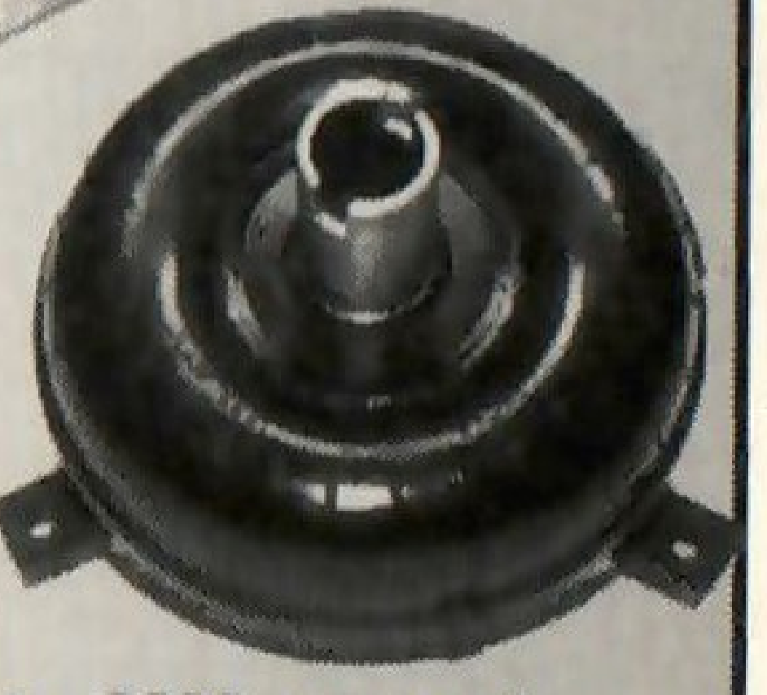

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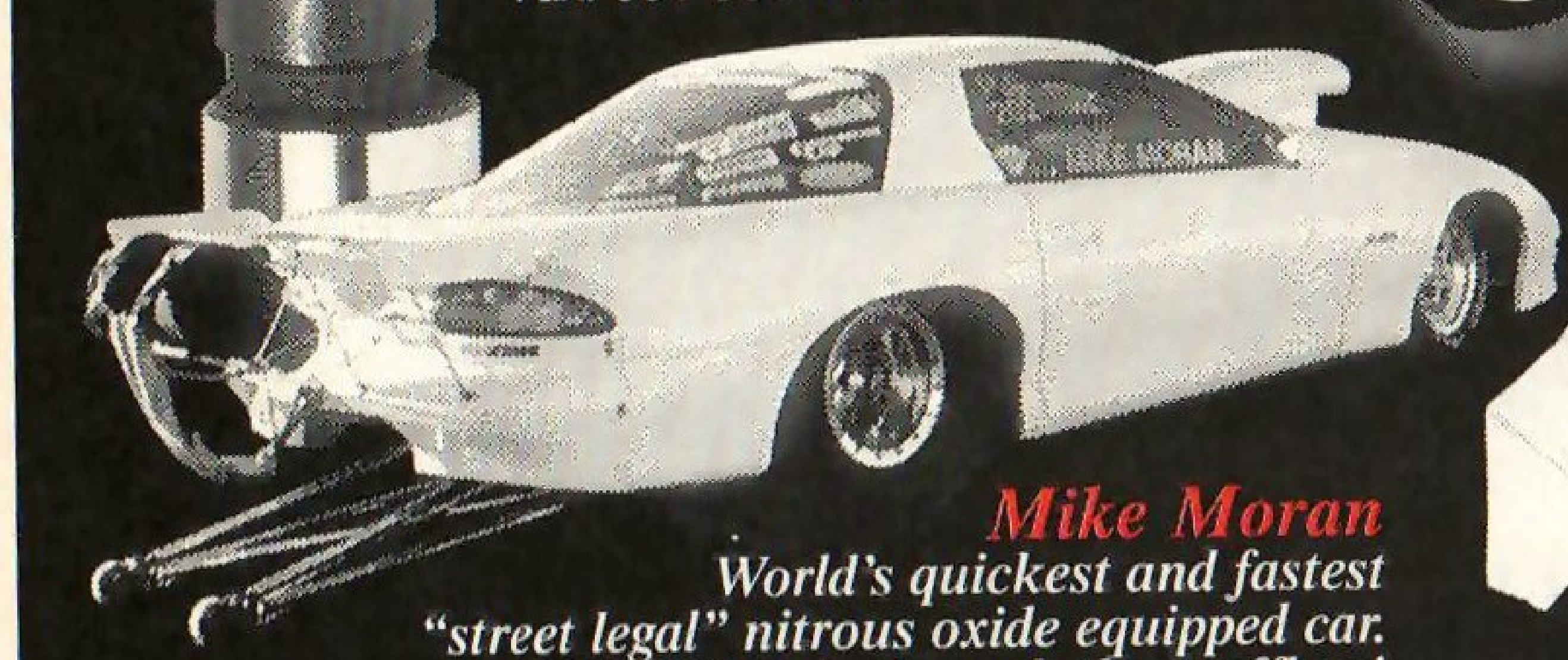

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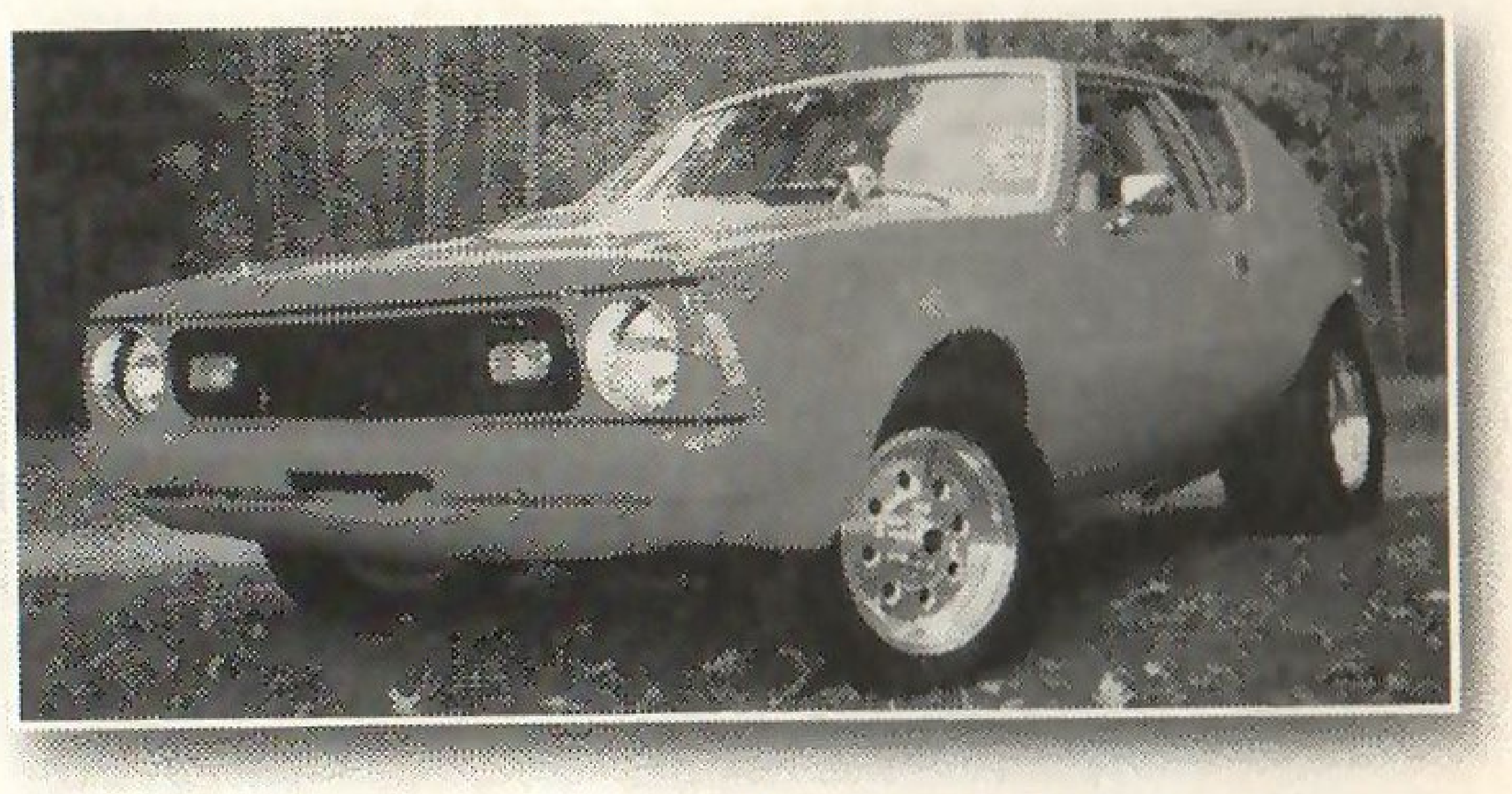
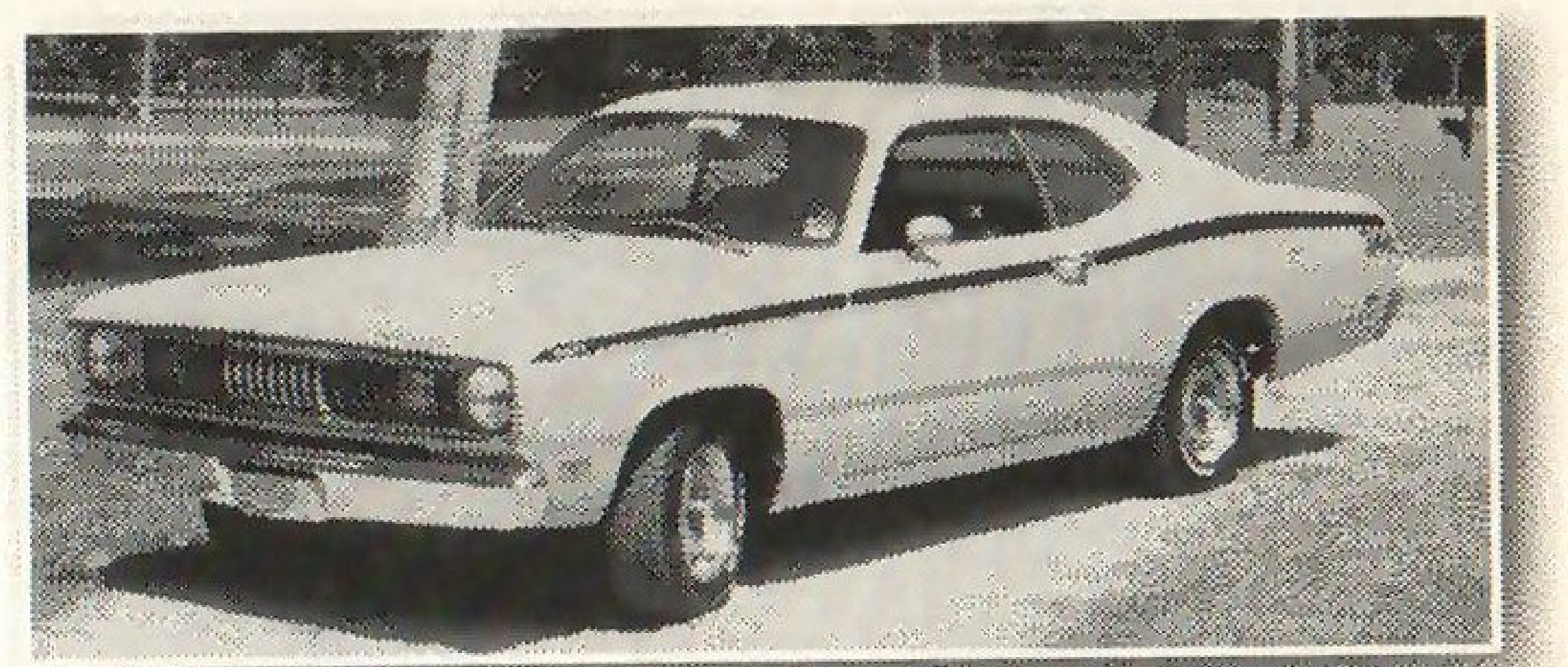
HOMETOWN HOT RODDING

(Continued from page 98)



Oh, the intimidating grille of a '71 Gremlin! Owner Randy McCandless has been a *PHR* subscriber for seven years and felt his AMC was finally up to the performance standard of a "Hometown" entry. While we're not big fans of the body style known for having better aerodynamic properties in reverse, we figured Randy's redo was deserving of a little attention.

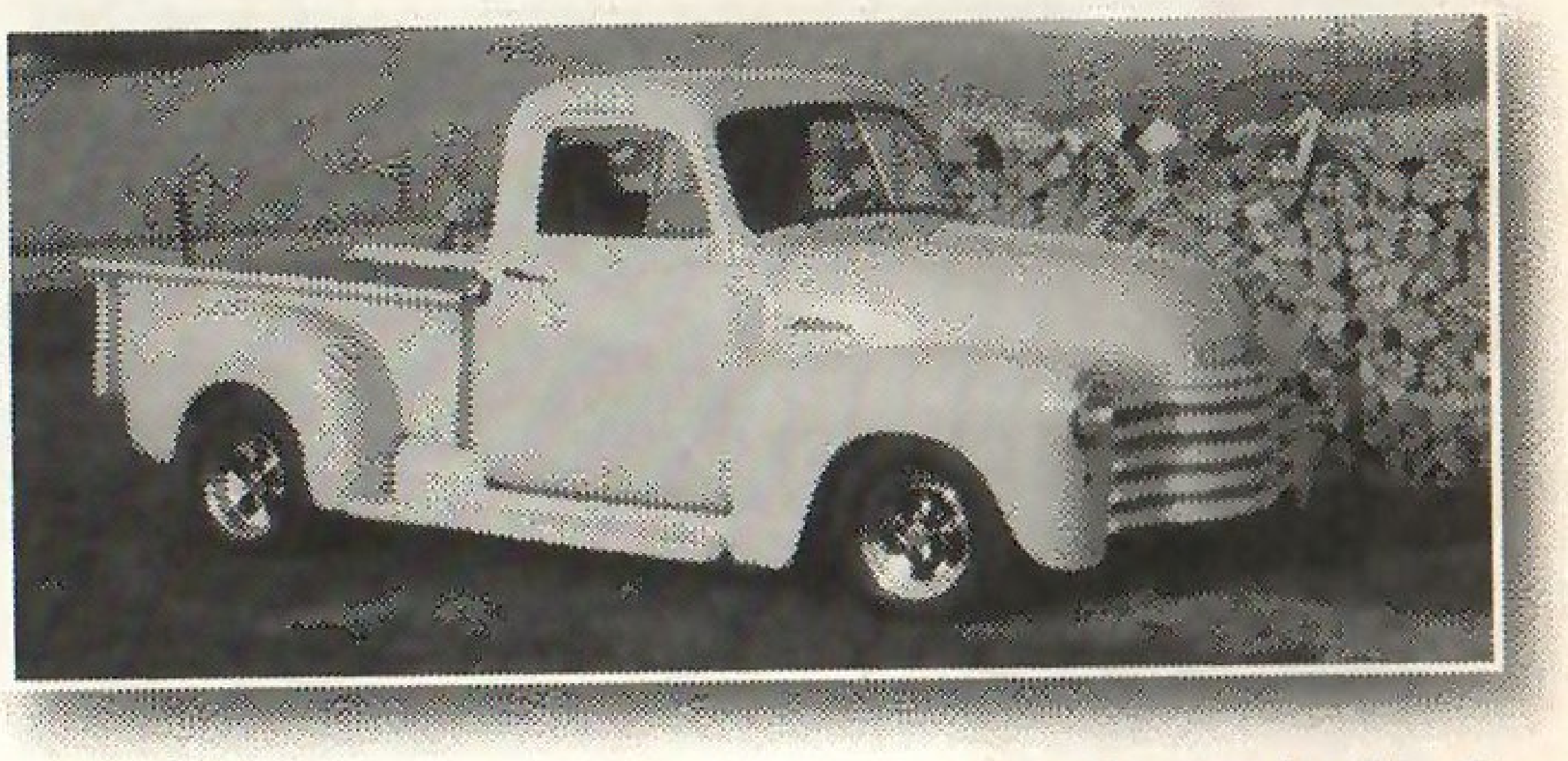
This Torch Red wonder has taken its share of drag titles since Randy installed a 327 Chevy, a TH400 trans, a TCI converter with 3000rpm stall, and a Dana 60 with 4.10:1 gears. Oh yeah - the NOS Super Power Shot of 150hp doesn't hurt either. The package has helped Randy go 12.06 at 110mph. That's with a bunch of spray applied right at the hit of the throttle, and the slicks make it all possible.



Stock can be a good thing, especially when it's original equipment of the clean type. Chuck Isherwood, a sergeant major with the United States Marine Corps from Hubert, North Carolina, knew we'd like his '71 Plymouth Duster with the matching numbers 340 still stuffed in the framerails. Well, it's not exactly stock, since it was bored .030-over in the rebuild and a .268 Comp Cam installed to boot.

It was recently repainted in the original, "Curious Yellow," the bumpers were rechromed and new-old-stock seat covers and carpet keep the interior's faith. The best part is that the Sarge is the original owner and holds the $3,127 retail sticker.

From the few that pass him on the highway, he always gets the thumbs-up (or a salute from those lower on the totem pole on the base).



Did your sister ever buy you a car for graduation? None of ours did, but the same can't be said for Columbia City, Indiana's Donavon Berry. She paid $500 for a clapped-out '51 Chevy pickup two years ago and is now shocked to see it's worth something more like $5000. The Berrys are plenty proud of Donavan's efforts, but not as proud as they are of sister Bobbi for forking out the cash in the first place. If it wasn't for Mother Joyce sending this photo to PHR, we'd have missed this nice story. Let's see if Donovan can find an occasion to return the favor?

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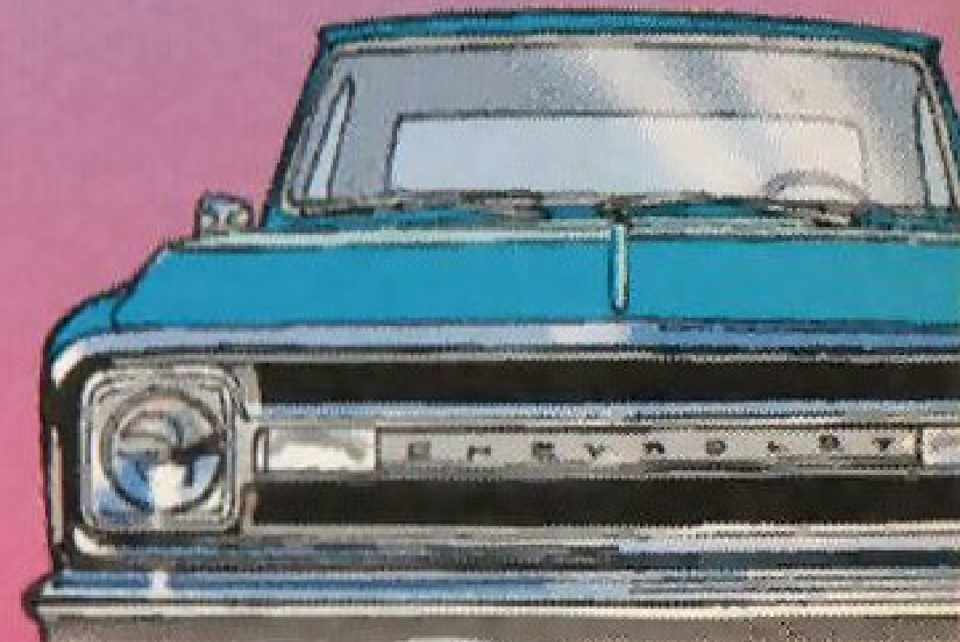

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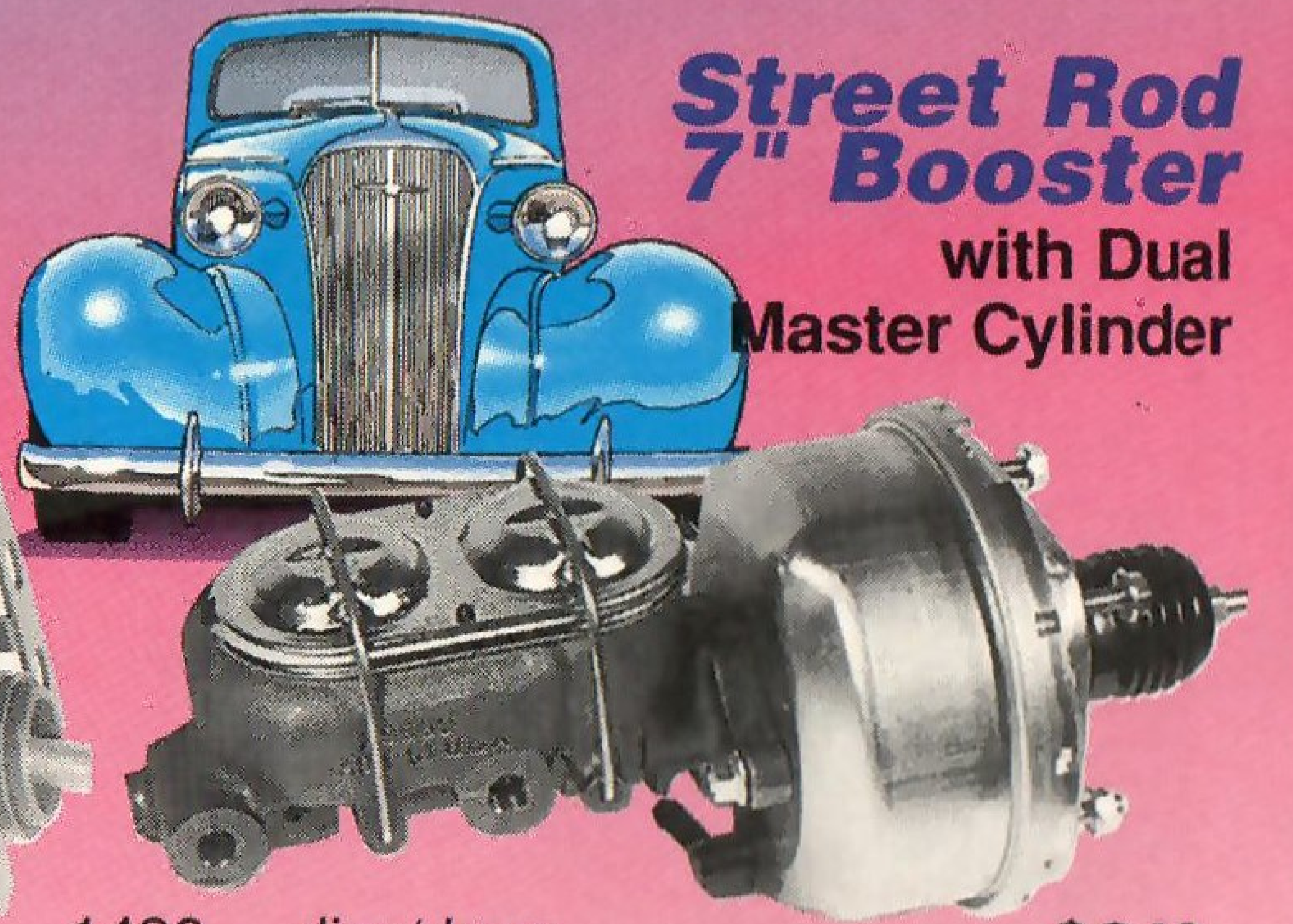

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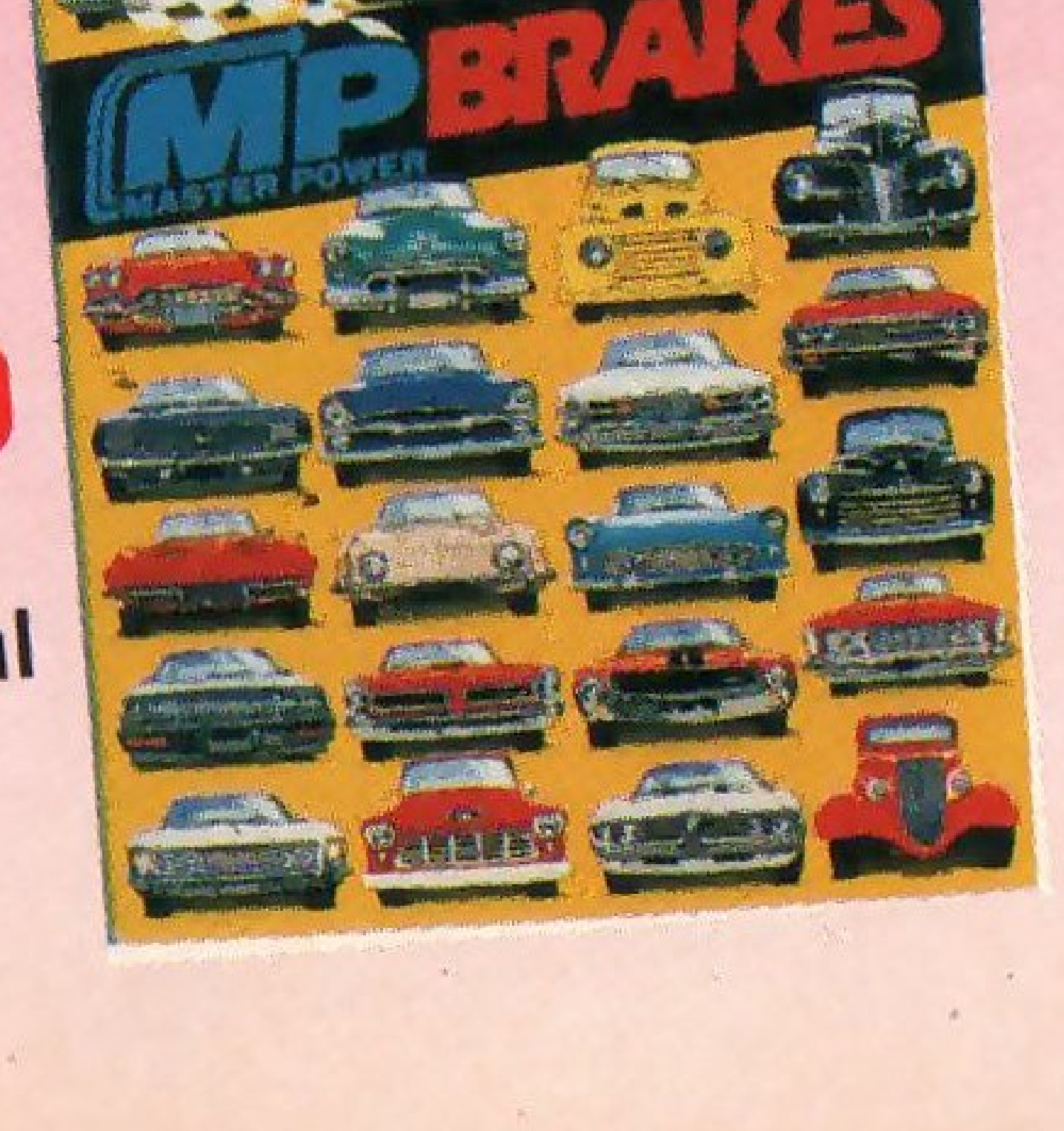

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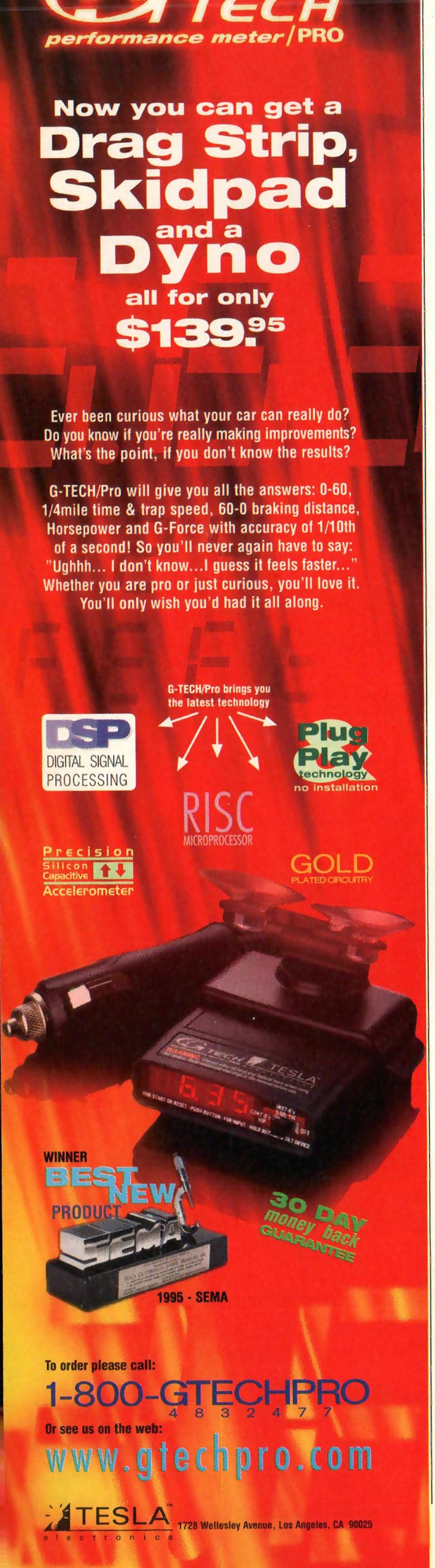

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CAN'T DRIVE 55

Q I own a moderately reworked '73 Chevy pickup truck that I would like to add some type of overdrive to. When this truck was built, the national speed limit was a modest 55mph, and the axle ratio allowed the engine to hum along nicely. Now, with the present speed limits, if I ran 55, I'd be sucked up someone's tailpipe. The truck is equipped with a 305 small block with a camshaft that the supplier called an "RV" cam. I added an aluminum high-rise manifold along with a 600 Holley carb. I run headers with a 2-1/2-inch exhaust system through 48-inch long glass pack mufflers (it sounds really nice). I also run an HEI ignition with some timing and advance tricks. It runs well, except for the high rpm at 65mph. I also run an old Muncie four-speed that has seen better days.

Here's the problem: I'd like to replace this transmission with a Borg Warner T-5, but I don't want to use a hydraulic clutch. I would like to find out if it is possible to use this transmission with a conventional fork and throw-out bearing setup? If so, I need to know what bell housing and fork setup to use, plus what bearing was used. What clutch disc and pressure plate should I use? I hope you can help.

Rick Shafer
Oakville, IN

A *If it were our truck, Rick, we'd definitely look at a hydraulic setup — but not the traditional master cylinder-slave assembly that you're used to seeing. Instead, give some thought to using a McLeod hydraulic release bearing. It still uses a master cylinder, but the slave is eliminated. The beauty of the McLeod setup is that it's clean, easy to setup, reliable and releases quickly. So quickly that a couple of savvy NHRA racers (we can't mention their names) are using them in class-legal cars. We can say that these cars race in the "competitive" eliminators where reaction time, ET and consistency are extremely important. The McLeod system is the key in the puzzle for stick shift applications. And yes, this concept is so good that the NHRA basically outlawed it in Pro Stock. As far as the clutch assembly is concerned, contact the folks at McLeod for their advice. They have new "soft lock up" technology that can be used on the street.*

HOW TO GET YOUR GOAT

Q I am writing for help to guide me in building my car. I have a 1966 GTO convertible with a 327 Chevy (I bought it with this motor installed), power steering, power brakes, Turbo 350 trans and a 2.89:1 rear end. I have a 455 Pontiac on an engine stand and I am purchasing parts to rebuild it. The motor is a 1974 block. I have a set of 1971 #96 heads to replace the 4X heads that are currently on it. I have a 1965 Tri-Power intake and carb setup. I'll be running headers with a 3-inch stainless exhaust system running into dual two-chamber Flowmasters.

My first question is about the cam choice: I'm looking at a Summit racing camshaft (272 duration, 442 lift on the intake and 282 duration, 465 lift on the exhaust (I'll run 1.5:1 ratio rockers with this cam). This engine will never see much over 5,000rpm. Should I advance this cam upon installation or is there enough advance already ground into it?

My second question is about a transmission choice. I want to run an overdrive transmission. Should I run a 2004R from a Grand National or a 700R4 (with an adapter)? How important is it to have a lock-up converter kit installed on these over-drive transmissions? (I've heard they'll overheat if they don't lock up). I hope to run a stock torque converter. What suggestions would you give to improve the durability of this transmission? I have a 3.62:1 ring and pinion and a new posi carrier that I will install. I do not plan to drive the car on

(Continued on page 104)

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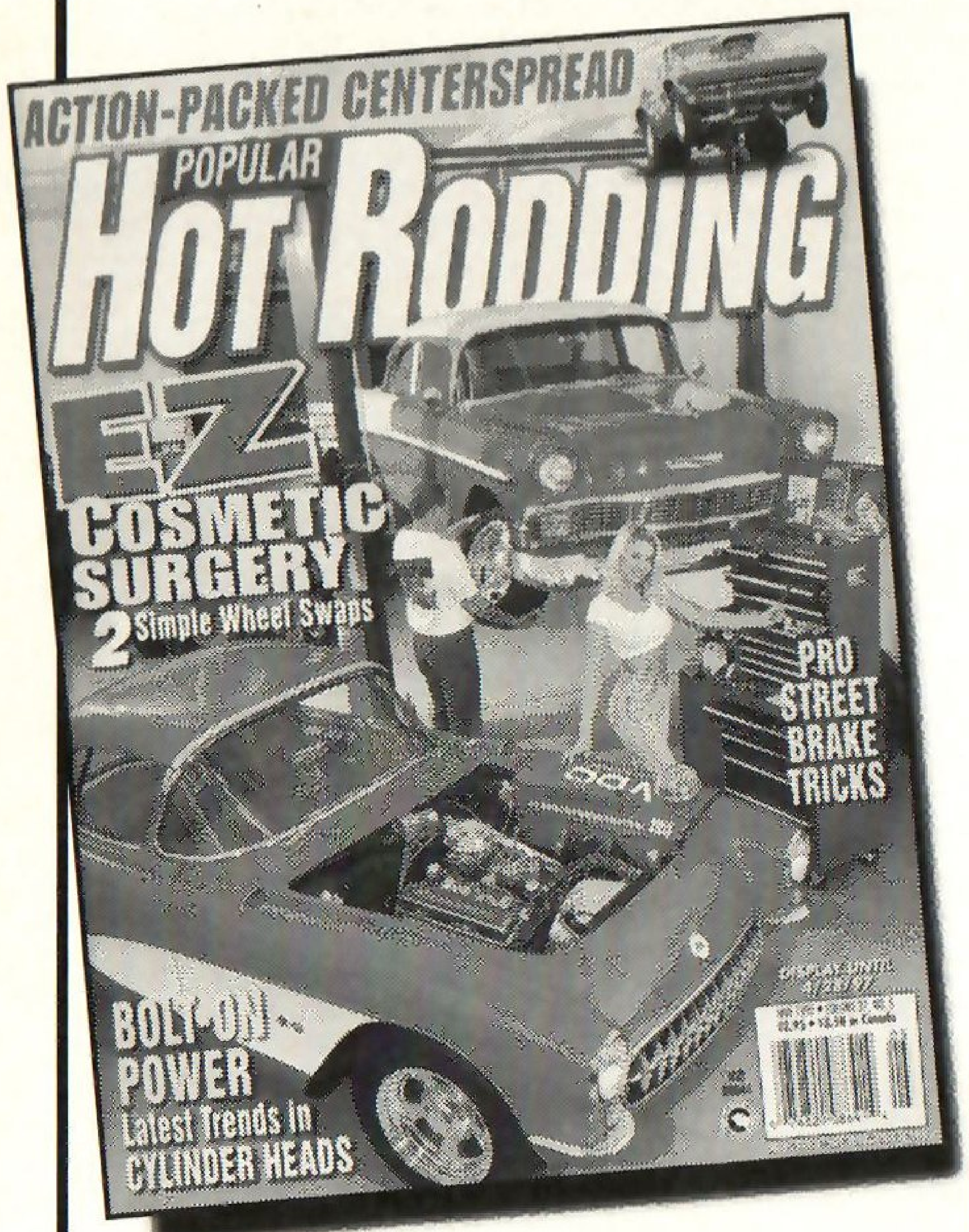
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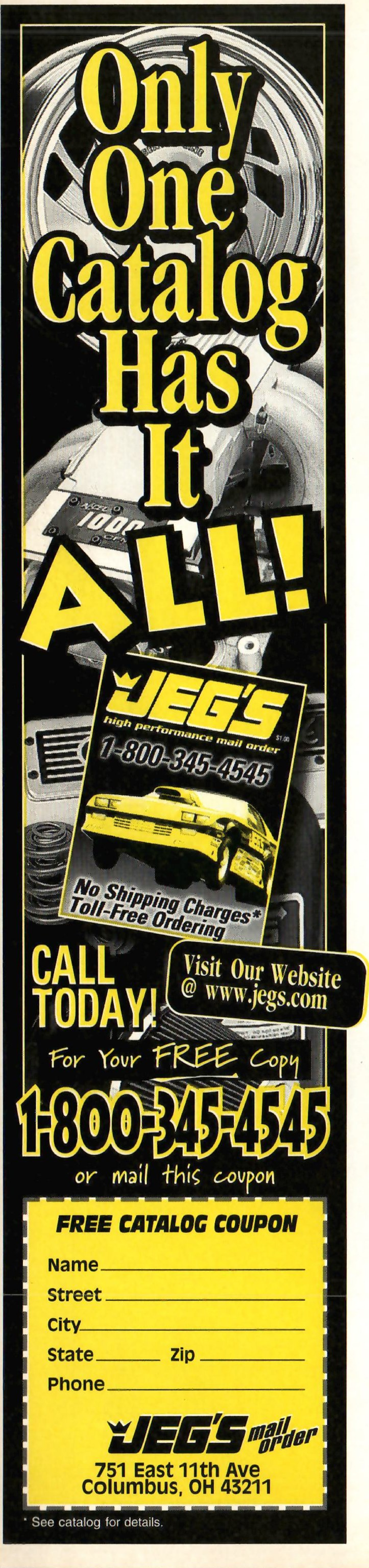

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(Continued from page 102)

the quarter-mile, other than once or twice a summer, just to answer my question of "how fast is it"?

The last question is about stopping this car. Once I get it going I want to go to front disc brakes. What car makes a perfect donor car for disc brake change over? Thanks for any advice you can provide.

Bob King
Deerfield, IL

A *The cam you've selected should work fine. Just don't expect it to be a real fire breather (the specs are somewhere between a factory Ram Air III and a Ram Air IV grind). And yes, the rpm range of the camshaft should be well within your self-imposed redline. Advancing or retarding the cam depends upon a bunch of variables, but the most important is this: How does the car run with the cam straight up (or installed according to the cam grinder's recommendations)? Once you've established this, then you can "adjust" the cam timing.*

As far as the transmission choice is concerned, we have a few reservations about both automatics you've selected. Neither was originally designed for the torque output of the powerplant you have. The TH2004R is notorious for being weak-kneed. And the 700R4 has a gear ratio package that simply isn't suited for a vintage muscle car engine combo (3.06:1 first gear; sharp "splits" between gears). That doesn't mean you can't get either transmission to work (or live) with your combination. You can, but either transmission will require some serious attention inside by a shop that really knows what they're doing. Quite honestly, we think your car will prove quicker and more fun with a good old fashioned Turbo 400. The swap is pretty straightforward (a '67 LeMans or GTO crossmember will be the only major piece required).

We've had good success using brake kits from Master Power on past projects (other manufacturers offer similar products). Basically, these companies do the footwork for you. They include all of the OEM hardware required to change over to disc brakes (and all of the pieces are either brand spanking new or rebuilt). And with your car it should be a pretty simple deal — GM introduced disc brakes in their intermediate lineup in 1967. If you decide to take the wrecking yard approach, any "A" body GM from that model year with a disc brake setup should be considered a cannibalism candidate for your GTO.

RAT'S NEST

Q I have a '69 Chevy 427 engine. I want to install a 454 crankshaft into this block. I have a new factory steel 454 crankshaft, flywheel, and harmonic balancer. I know I can use the 427 connecting rods, but I need to know what pistons to use (427 or 454), and what type of main and rod bearings to use, as the bearing journals on the 454 are larger. I understand the 427 will become a 454 with this crankshaft installed.

D. Fletcher
San Bruno, CA

A *You're correct with most of your information Mr. Fletcher, but one piece of your puzzle is incorrect: 396, 427, 454 (and all other rat motors for that matter) all have the same main and connecting rod journal diameters. In other words, a 454 crank will physically bolt into a 427 block with zero changes (it will actually fit into a 396 case too — but that's another story). Pistons aren't a bolt-in. The compression height of a stock 396 or 427 piston is 1.760-inches. A stock 454 uses a piston with a compression height of 1.645-inches. You need 454 pistons to make your combination a 454.*

BOOSTER SHOT

Q I own a 1968 Malibu and have built a 427 bored .060 over. I'm listing the specs in the hope you might tell me if I'm on the right track for my goal: I want to run low 10s or high 9s. The 427 includes an 850 Holley double pumper on a Strip Dominator intake. The heads are 188 casting iron heads, pocket ported and polished (chambers) with 2.19 and 1.88 valves. The block includes main and head studs. I have installed TRW L2300 forged pistons for a compression ratio of 8.24:1. The camshaft I am using is an Isky blower cam with the following specs: Intake lift: .575. Exhaust lift: .595; intake and exhaust duration is 247 and 254 at .050 respectively. Lobe center is 110 degrees (cam is a solid).

I'm using a Procharger 600B centrifugal blower with a good 12 pounds of boost. The ignition includes all MSD hardware. The transmission is a TH400 with a brake, containing a Precision Industry Vigilante 9.5-inch converter (4,500-stall speed), along with a custom race driveshaft. From there, the power goes to a 12-bolt fitted with 3.90 gears, spool and c-clip eliminators. Tires will be Hoosier slicks (28x10.5x15). Traction control is handled by SSM lift bars. Hopefully, I have provided enough info to make a guesstimate. The car weighs in at 3,600 pounds.

Thank you
David Melcher, Jr.
Lincoln Park, MI

A *Interesting combination David. We like it, but there are some caveats: Your engine should produce somewhere in the neighborhood of 660-700hp (depending upon the real efficiency of the supercharger). Trying to hook that much power on a small tire such as yours, coupled with a relatively stock suspension arrangement won't be easy. We'd suggest a set of good adjustable shocks, a good selection of springs to go with them (different rates), and several different torque converters. From this vantage point, it seems like a softer leave (say in the range of 2,800 to 3,000rpm) might work the best. If possible, think about using a taller tire. Increasing the tire diameter actually increases the footprint (this is important if you're restricted in terms of tire width). And yes, you're on your way to attaining your goals.*

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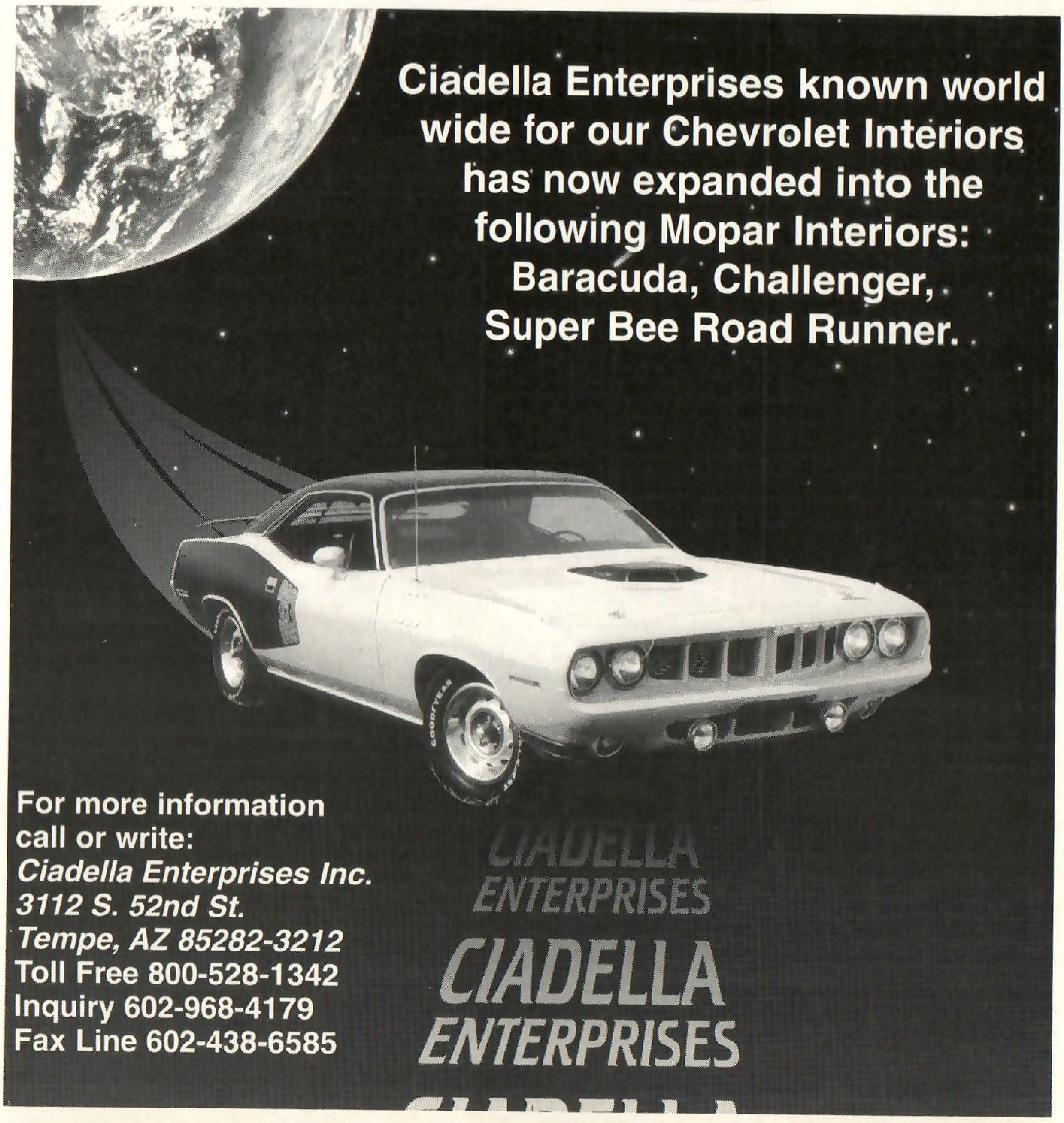
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May 24-25	New England Dragway	TV Epping, NH
May 31-June 1	U.S. 131 Dragway	Martin, MI
June 7-8	Atlanta Dragway	TV Commerce, GA
June 14-15	Texas Motorplex	TV Dallas, TX
June 21-22	Raceway Park	Englishtown, NJ
● June 28-29	Maple Grove Raceway	Reading, PA
July 12-13	Bristol International Raceway	TV Bristol, TN
★ July 18-20	Indianapolis Raceway Park	TV Indianapolis, IN
★ July 25-27	Maple Grove Raceway	TV Reading, PA
★ August 1-3	Norwalk Raceway Park	TV Norwalk, OH
August 16-17	Bandimere Speedway	Denver, CO
Sept. 20-21	Rockingham Dragway	TV Rockingham, NC
Oct. 11-12	Virginia Motorsports Park	TV Petersburg, VA
Oct. 18-19	Gainesville Raceway	TV Gainesville, FL

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CAMARO	1967-69, 1970-81, 1982-1992*, 1993 & newer* (FYB)
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EL CAMINO	(FYB)
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MONTE CARLO	1970-72*, 1973-88*, 1995 & newer* (FYB)
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OPEN	All Chevys not included in a specific category. (Show options to be determined)
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PRO STREET	All Chevy vehicles with 75% of an original frame, having a physically narrowed rear end AND wheel well tubs. (Tubs are defined as tubs, not expanded wheel wells). Show Options to be determined.

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*DOT STREET TIRE	$1,000	$400	$125	$100	$75

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TWO DAY EVENT SCHEDULE

- FRIDAY -

Participant Early Bird Registration	Noon - 4pm
Track Secured	5pm

- SATURDAY -

Gates Open	7am
Registration (Drag/Show/Swap/Car Corral)	8am - 4pm
Tech Inspection	8am - 4pm
Time Trials	9am - 5pm
BFGoodrich Tires Car Show Judging Seminar	10:30am
Professional Racing	1pm and 4:30 pm
SoffSeal "Attention To Detail" ™Seminar	2pm
BFGoodrich Tires Car Show Specialty Awards	3pm
Ticket Booths Close	4pm
Track Secured	5pm

- SUNDAY -

Gates Open	8am
Swap Meet/Car Corral Registration	8am - Noon
BFGoodrich Tires Car Show Registration	8am - 11am
Racer Registration/Tech Inspection *(Except Englishtown)*	8am - 10am
Time Trials *(Not Guaranteed -None at Englishtown)*	8:30am - 11am
Racers for Christ Service *(non-denominational)*	9:30am
SoffSeal "Race Against Drugs" Presentation	10:30am
Eliminations Begin *(9am Englishtown)* All others	11am
Professional Racing	1pm and 4:30pm
SoffSeal "Attention to Detail" ™Seminar	2pm
BFGoodrich Tires Car Show Event Awards	3pm
Ticket Booths Close	4pm
Track Secured	5pm

THREE DAY EVENT SCHEDULE

- THURSDAY -

NOTE: *(Thursday schedule applies **only** to Indy & Maple Grove)*

Participant Early Bird Registration	Noon - 4pm
Track Secured	5pm

- FRIDAY -

NOTE: *(Friday schedule applies **only** to all 3-day events)*

Participant Gates Open	7am
Early Bird Registration *(Pomona & Norwalk)*	8am - 4pm
Registration (Drag/Show/Swap/Car Corral)	8am - 4pm
Tech Inspection	8am - 4pm
Spectator Gates Open	8am
Time Trials	8:30am - 4pm
Track Secured	5pm

- SATURDAY -

Gates Open	7am
Registration (Show/Swap/Car Corral)	8am - 4pm
Racer Registration *(8am - 4pm Indy)* All others	8am - Noon
Time Trials *(8:30am - 4pm Indy)* All others	8:30 - Noon
BFGoodrich Tires Car Show Judging Seminar	10:30am
Professional Racing	1pm and 4:30 pm
First Round of Eliminations *(except Indy)*	1pm
SoffSeal "Attention To Detail" ™Seminar	2pm
BFGoodrich Tires Car Show Specialty Awards	3pm
Ticket Booths Close	4pm
Track Secured	6pm

- SUNDAY -

Gates Open	8am
BFGoodrich Tires Car Show Registration	8am - 11am
Swap Meet/Car Corral Registration	8am - Noon
Eliminations Begin *(Indy only)*	8am
Eliminations Continue *(except Indy)*	8:30am
Racers for Christ Service *(non-denominational)*	9:30am
SoffSeal "Race Against Drugs" Presentation	10:30am
Professional Racing	1pm and 4:30pm
SoffSeal "Attention to Detail" ™Seminar	2pm
BFGoodrich Tires Car Show Event Awards	3pm
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Track Secured	6pm

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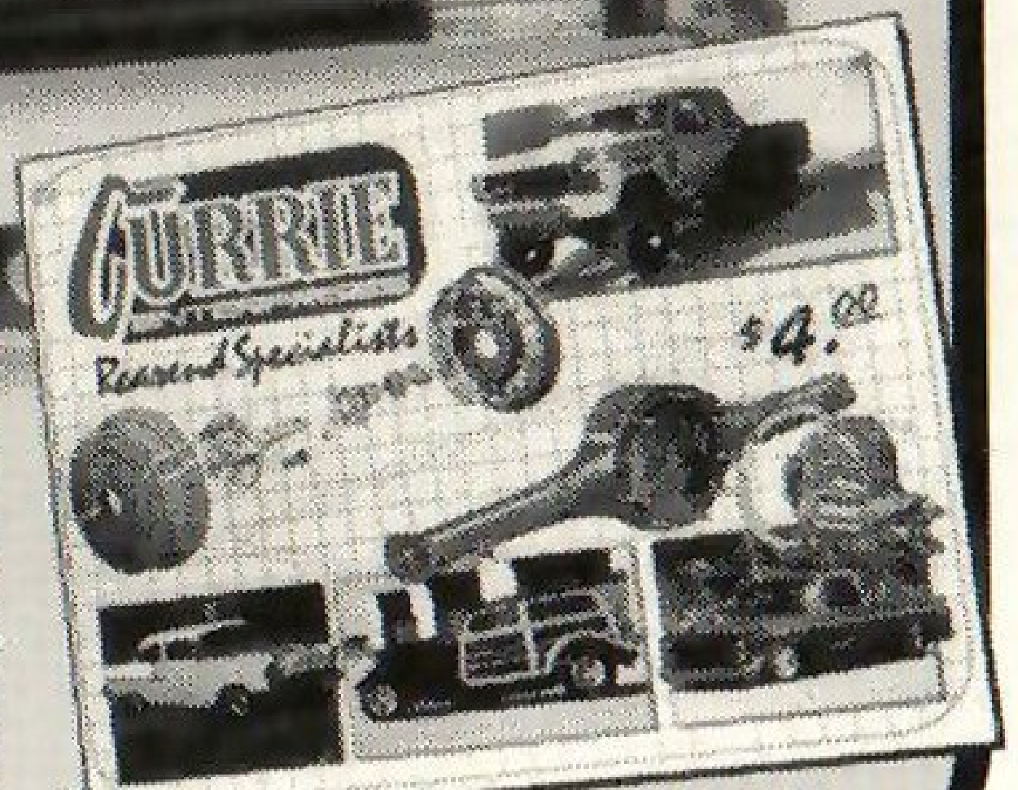

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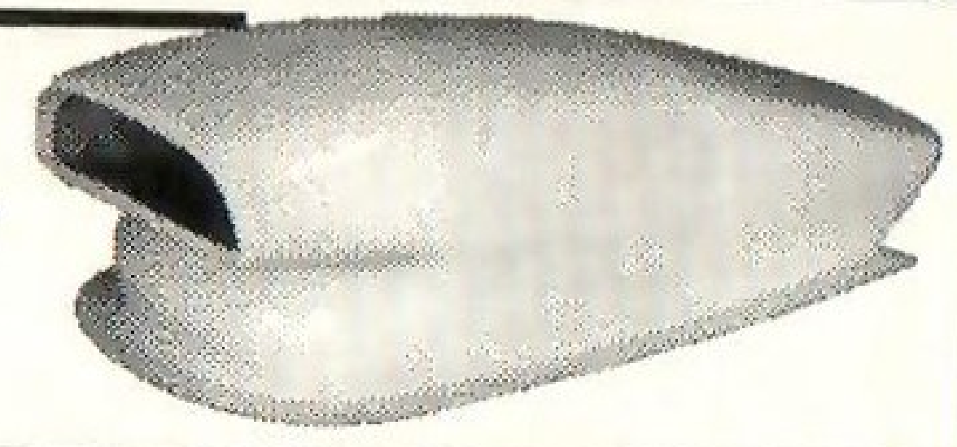

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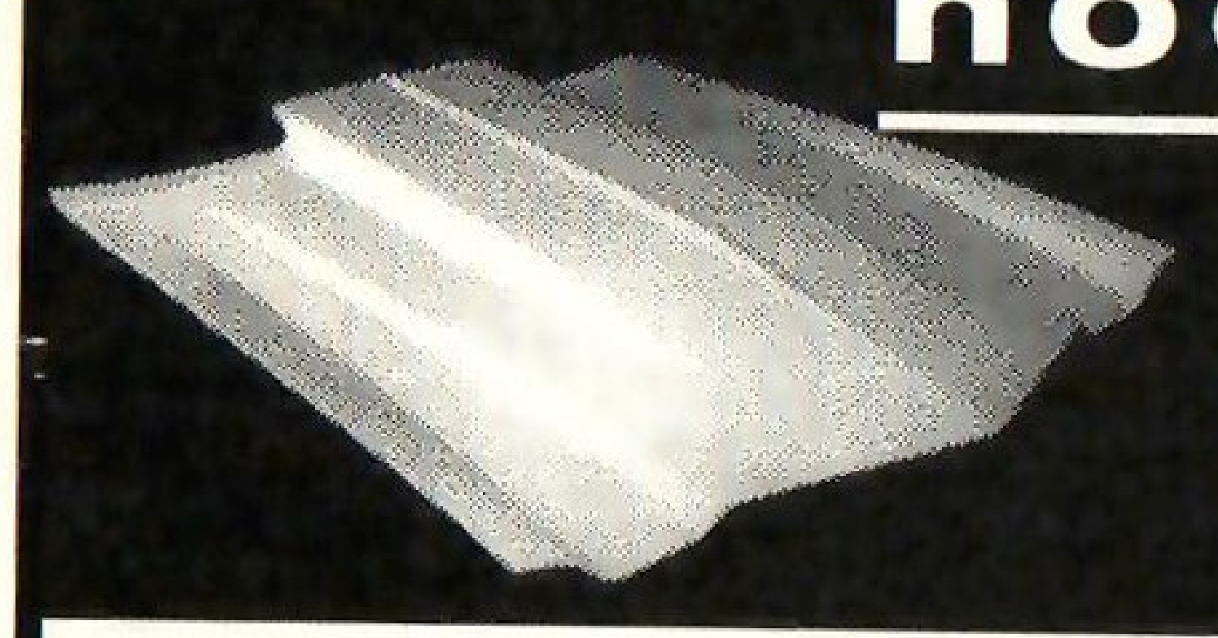

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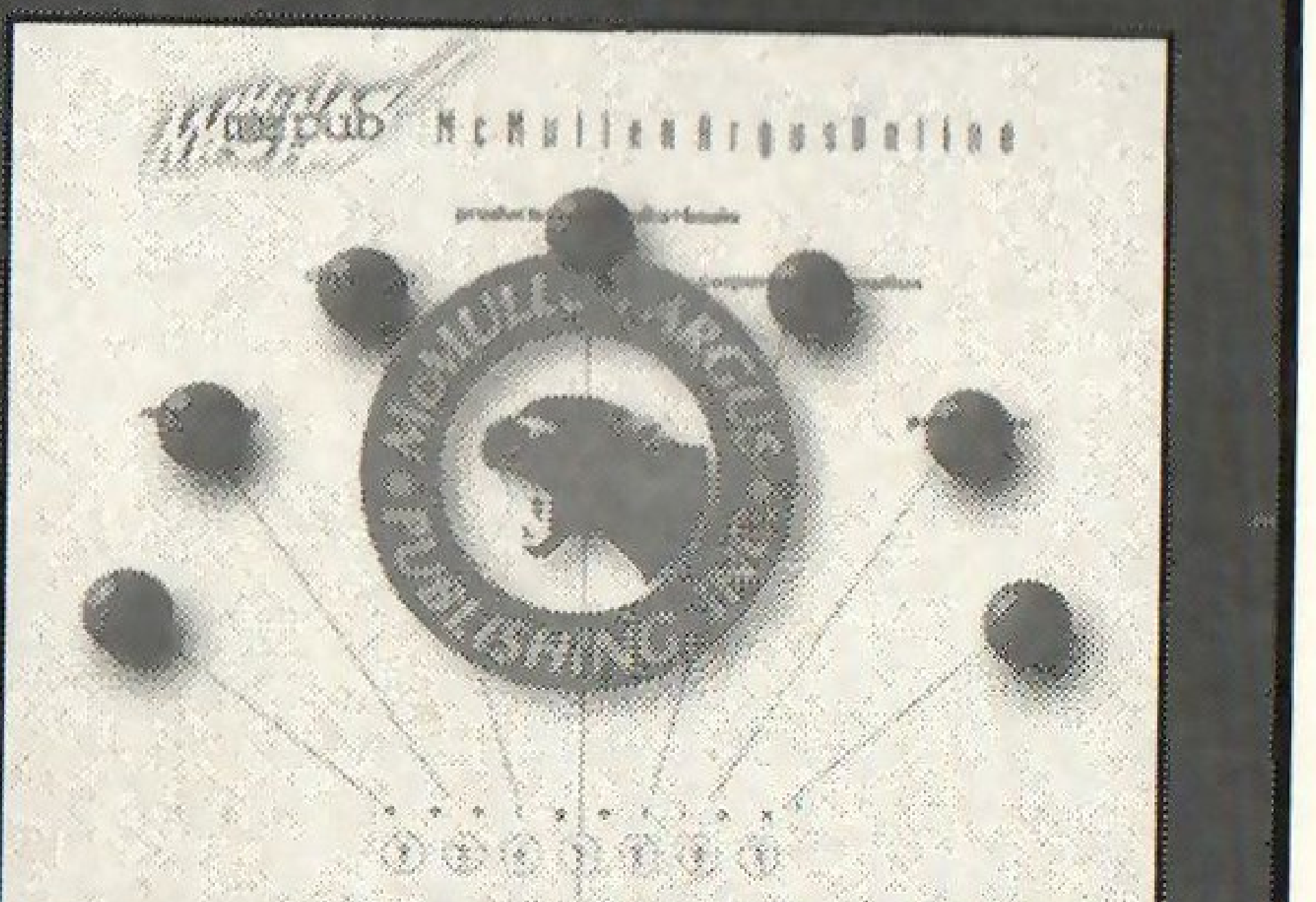
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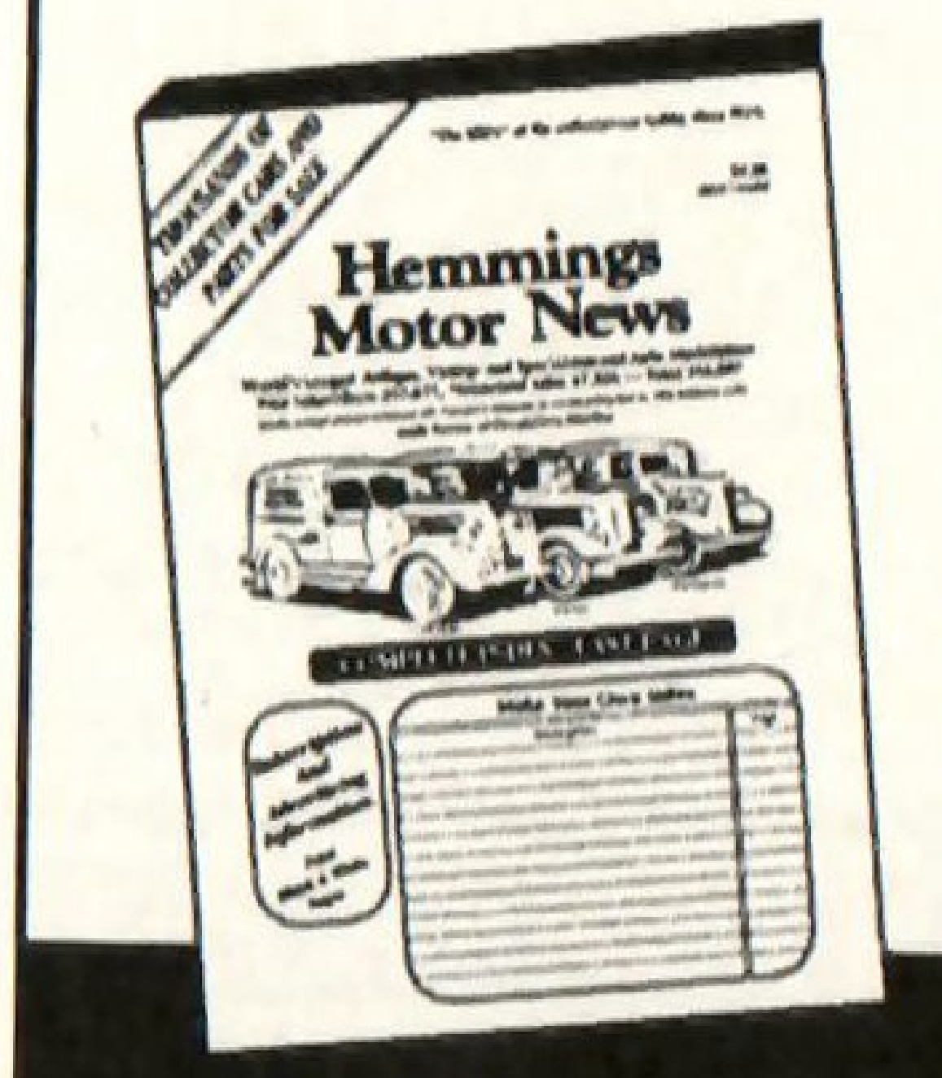
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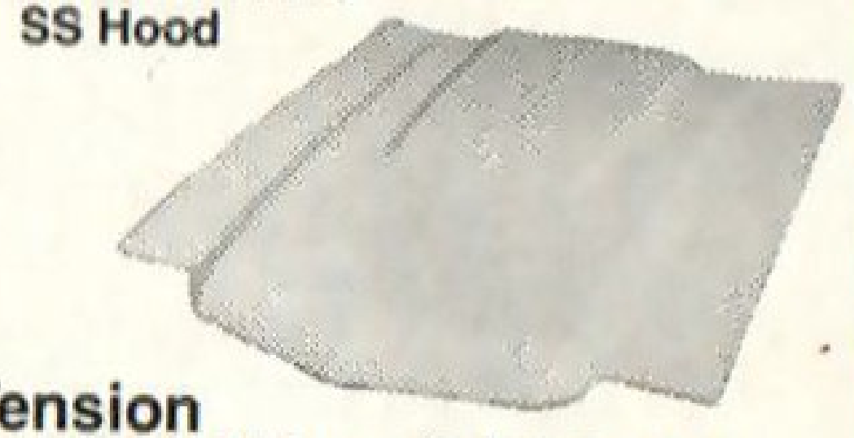

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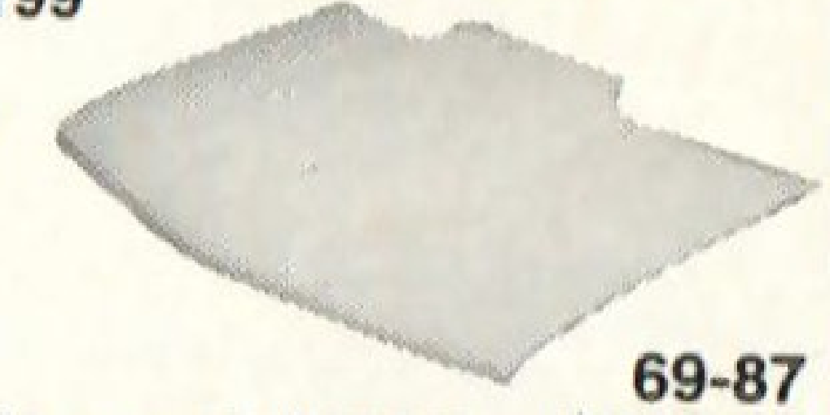

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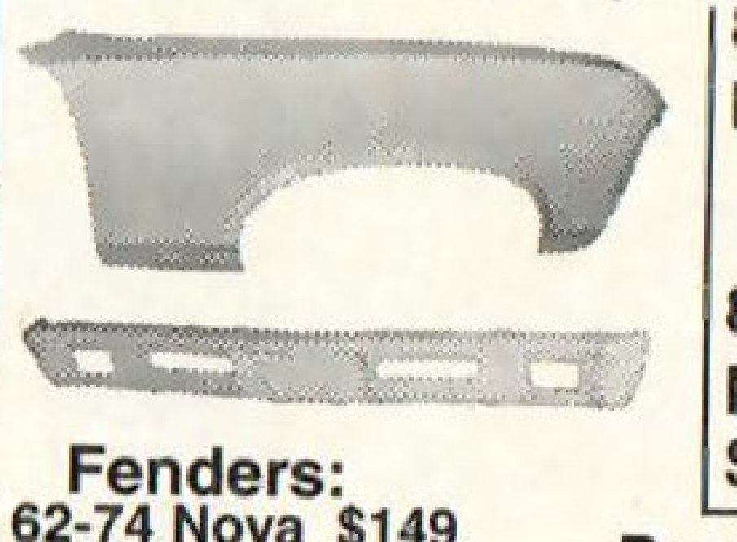

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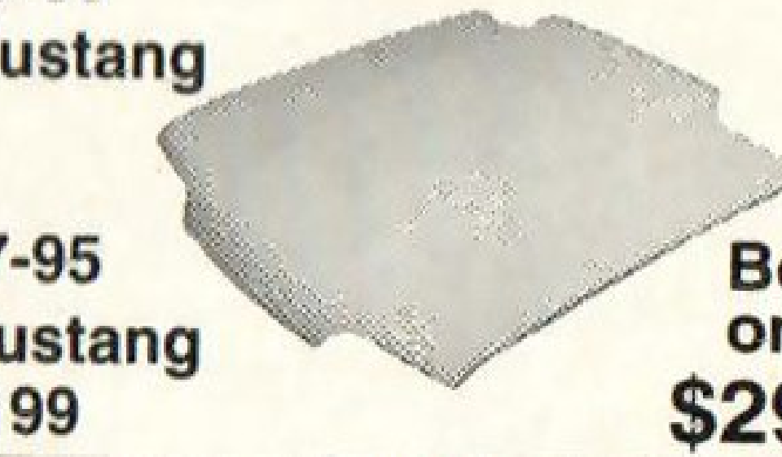

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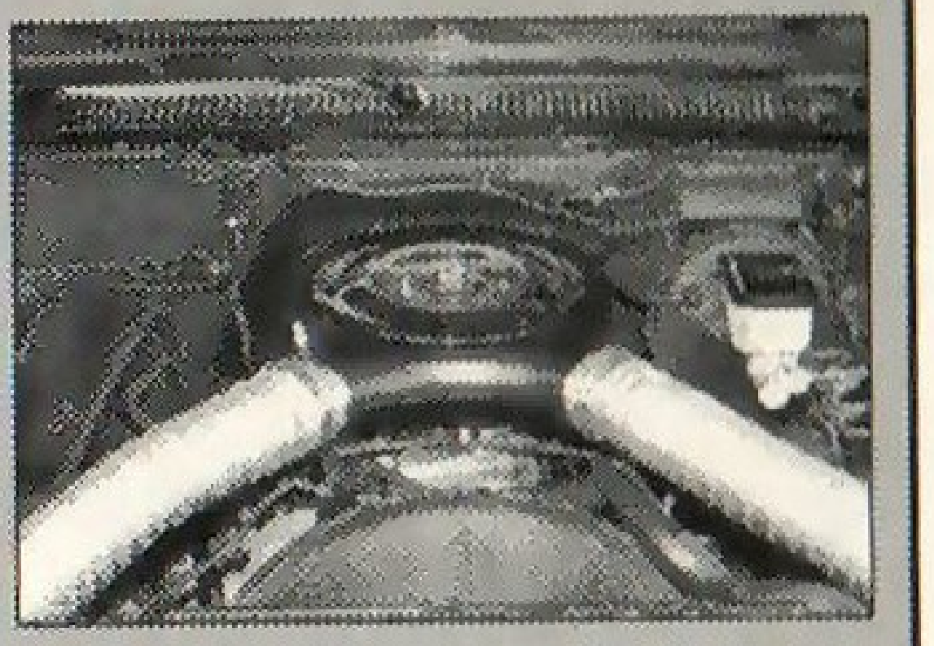

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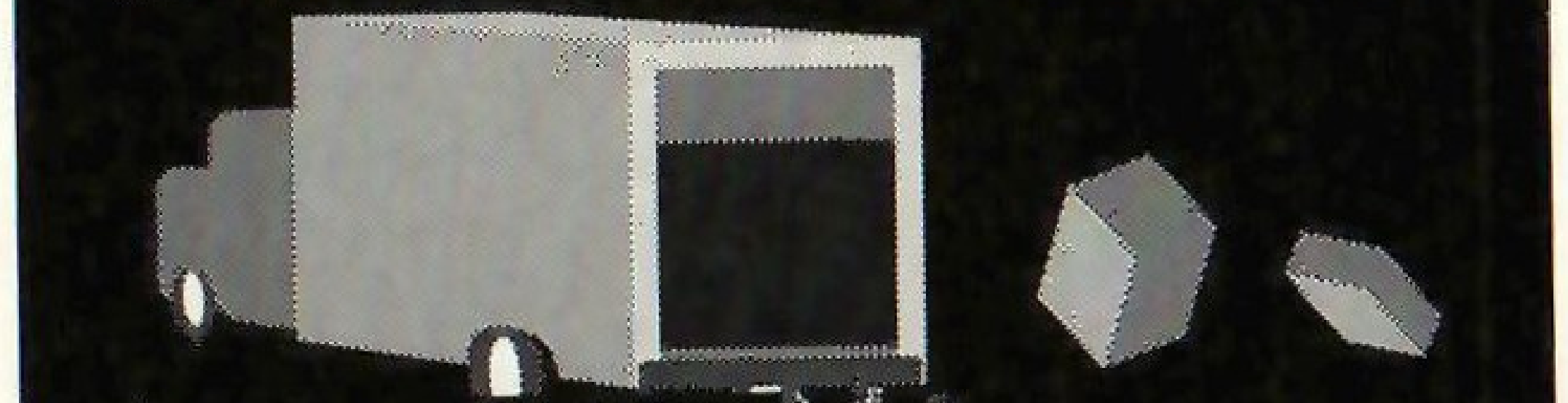

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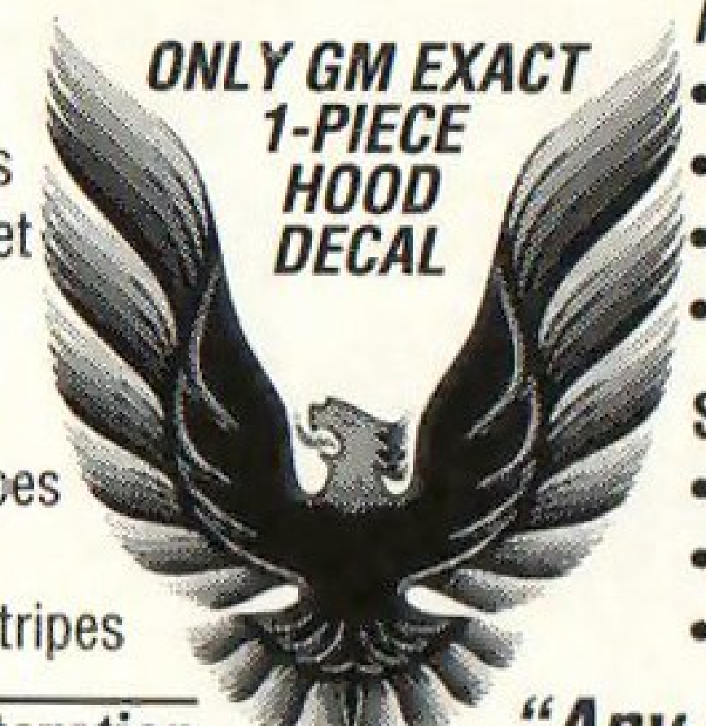

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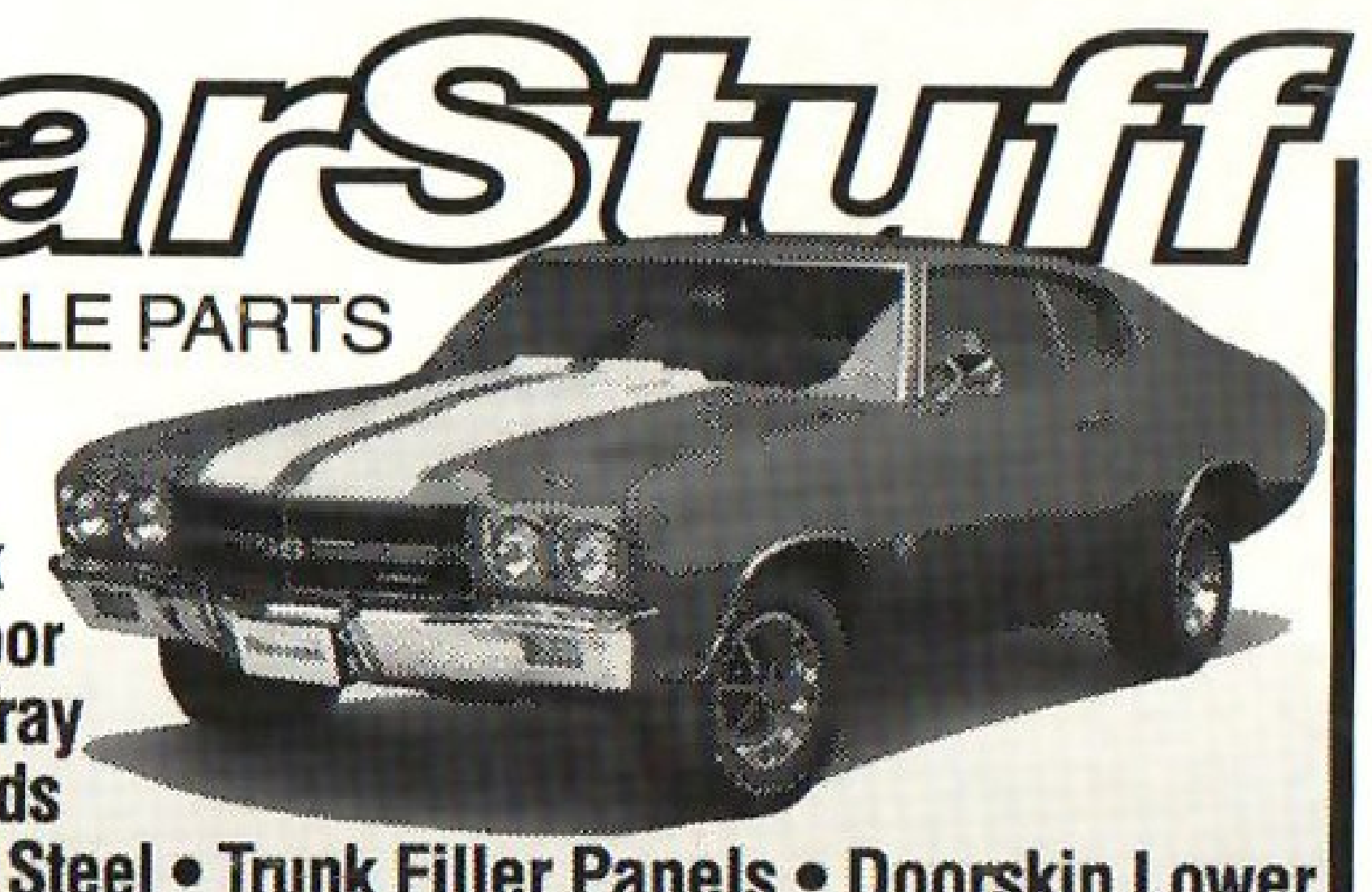

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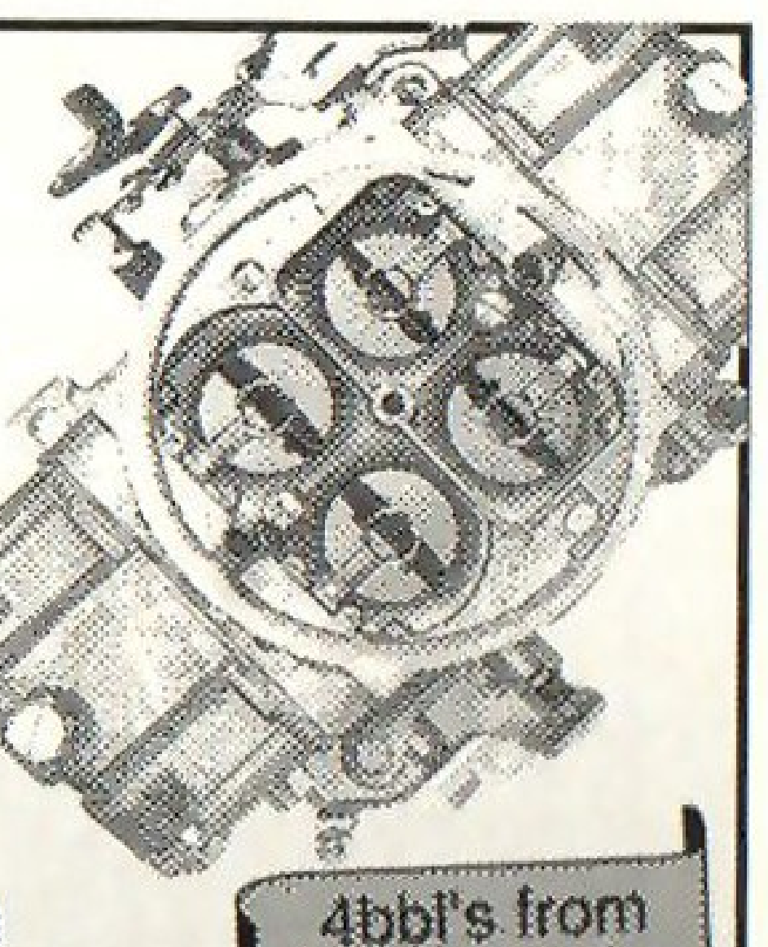

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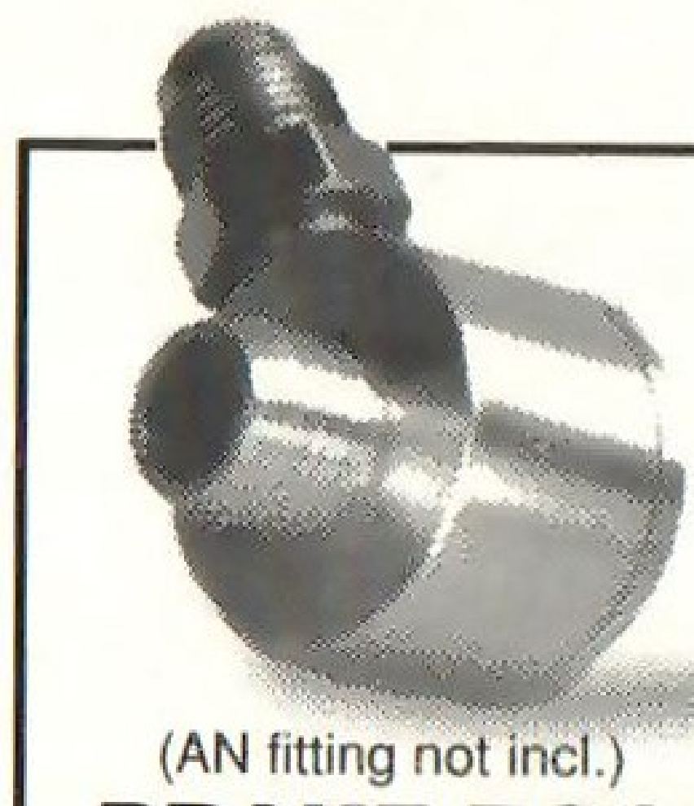

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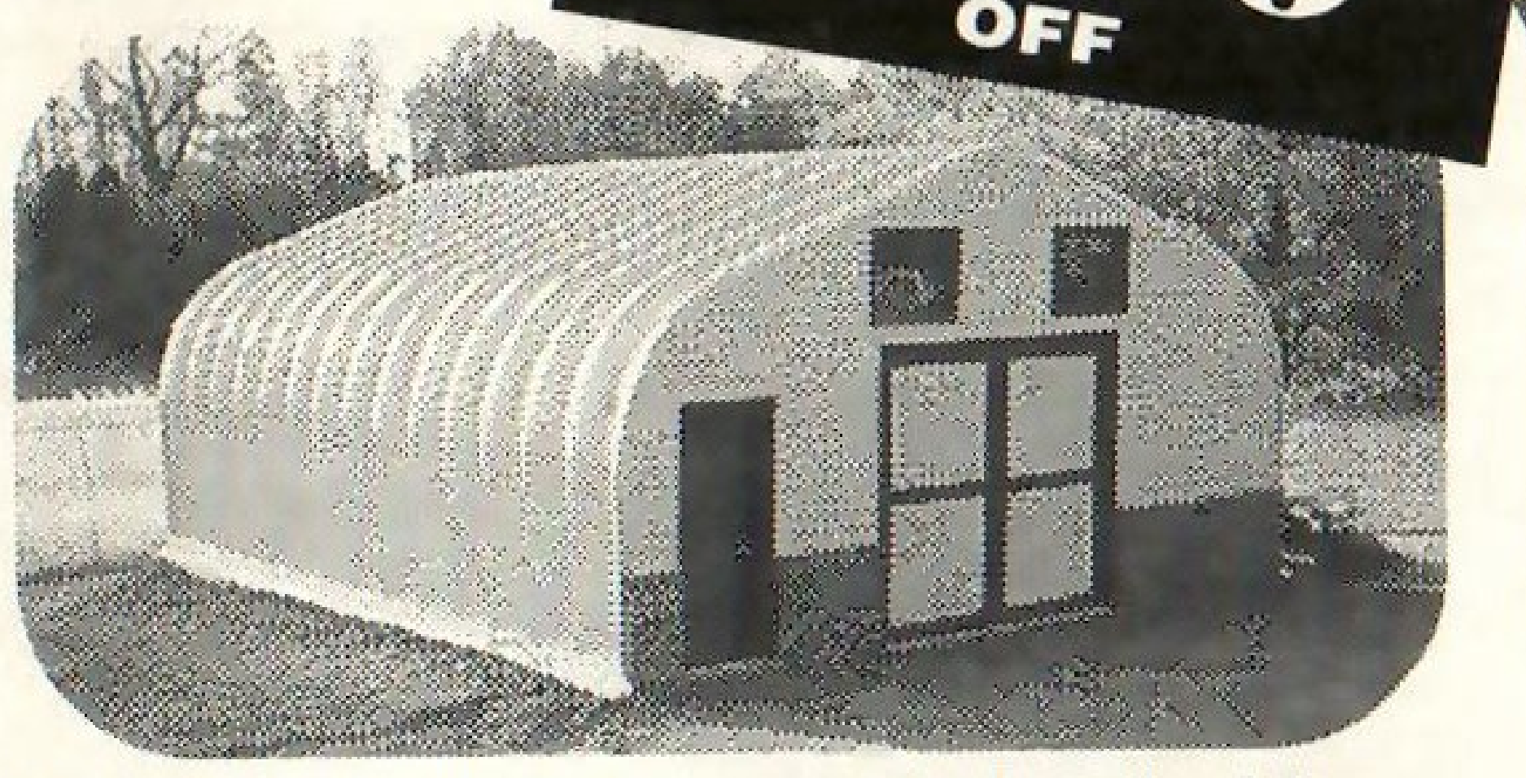

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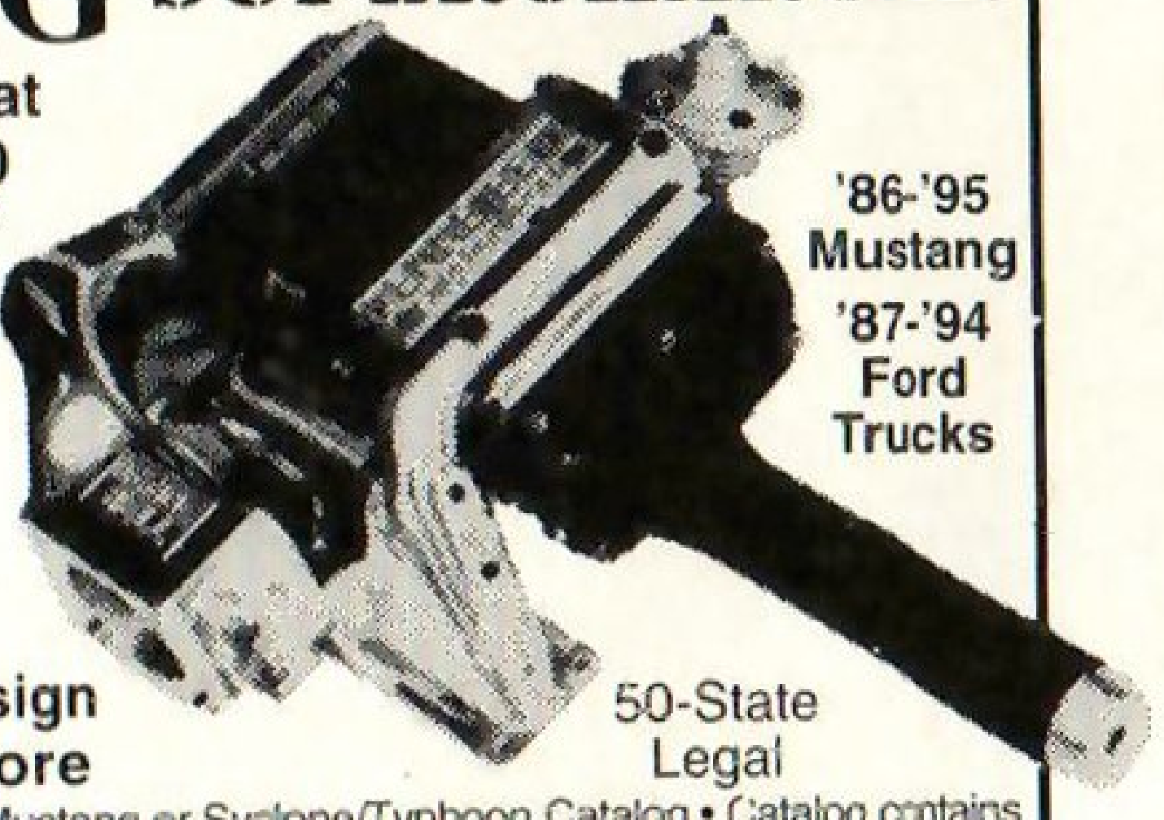

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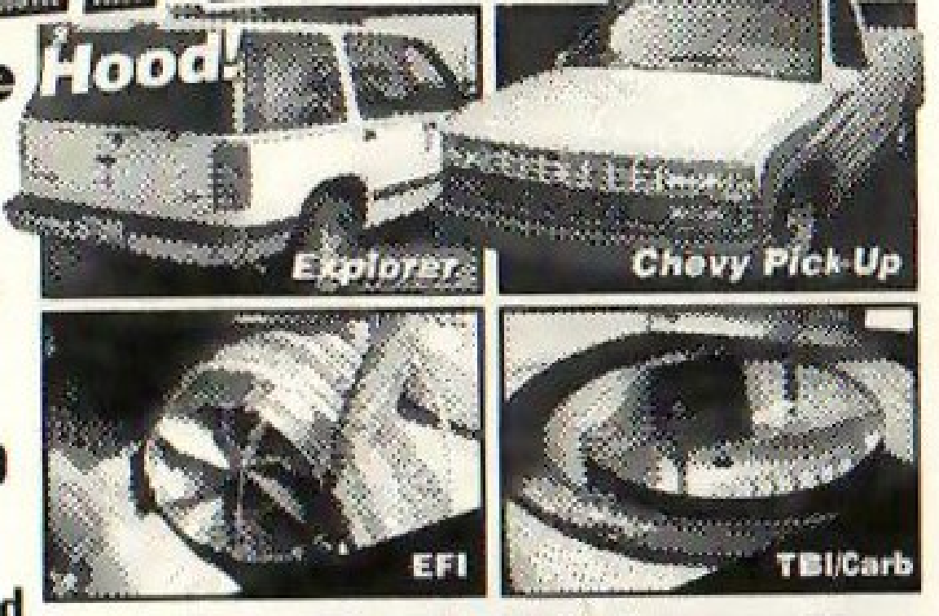

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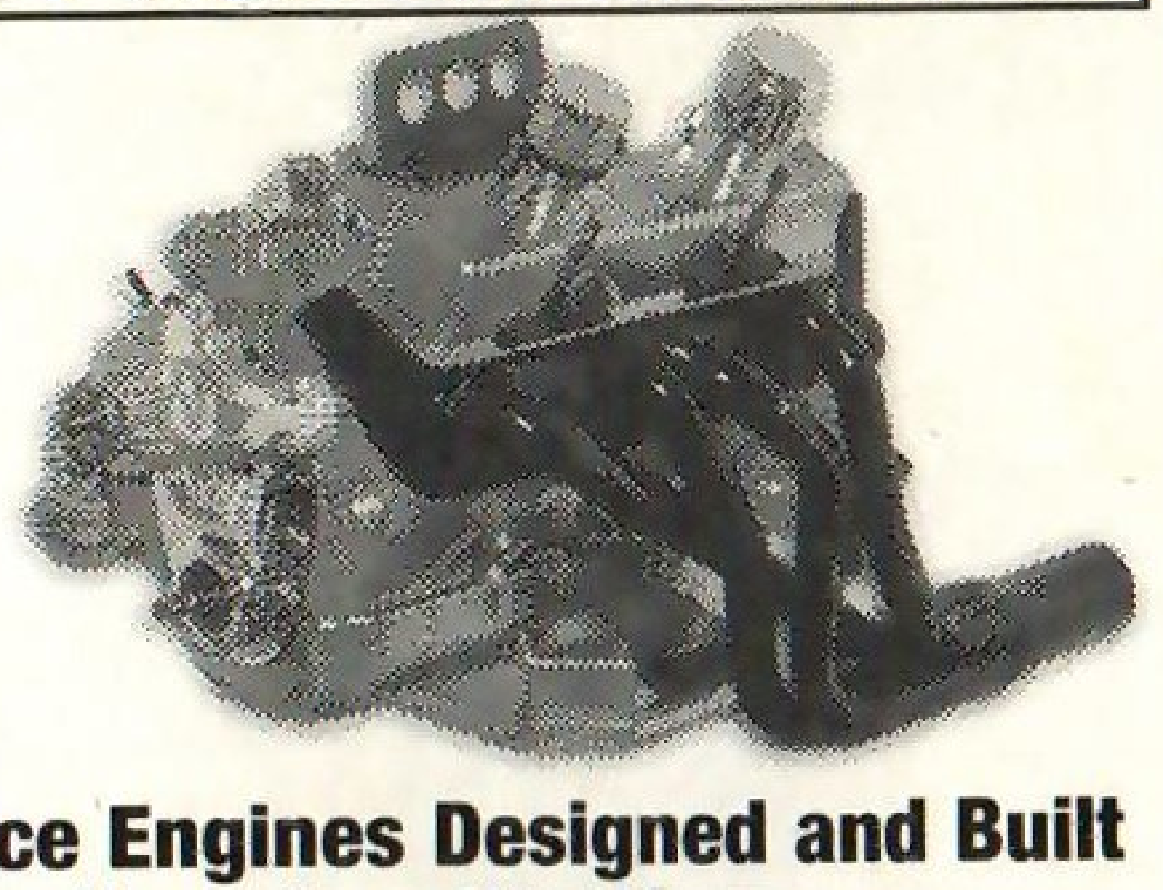

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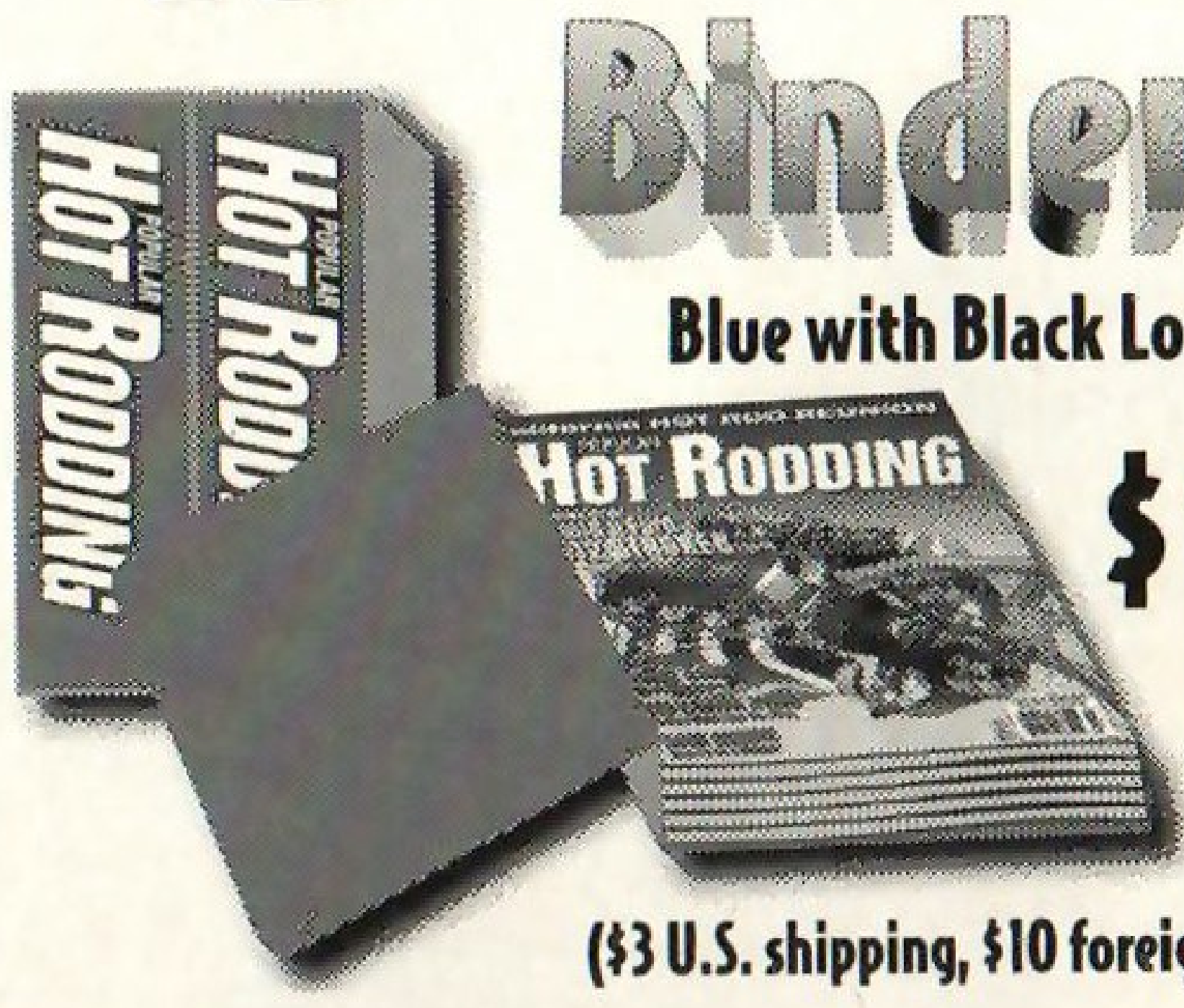

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BACKTRACKIN'

Racing Images From The Past

PHOTO BY BOB McCLURG

POPULAR HOT RODDING

BA 166
CHEERS TO YA DUCKS.
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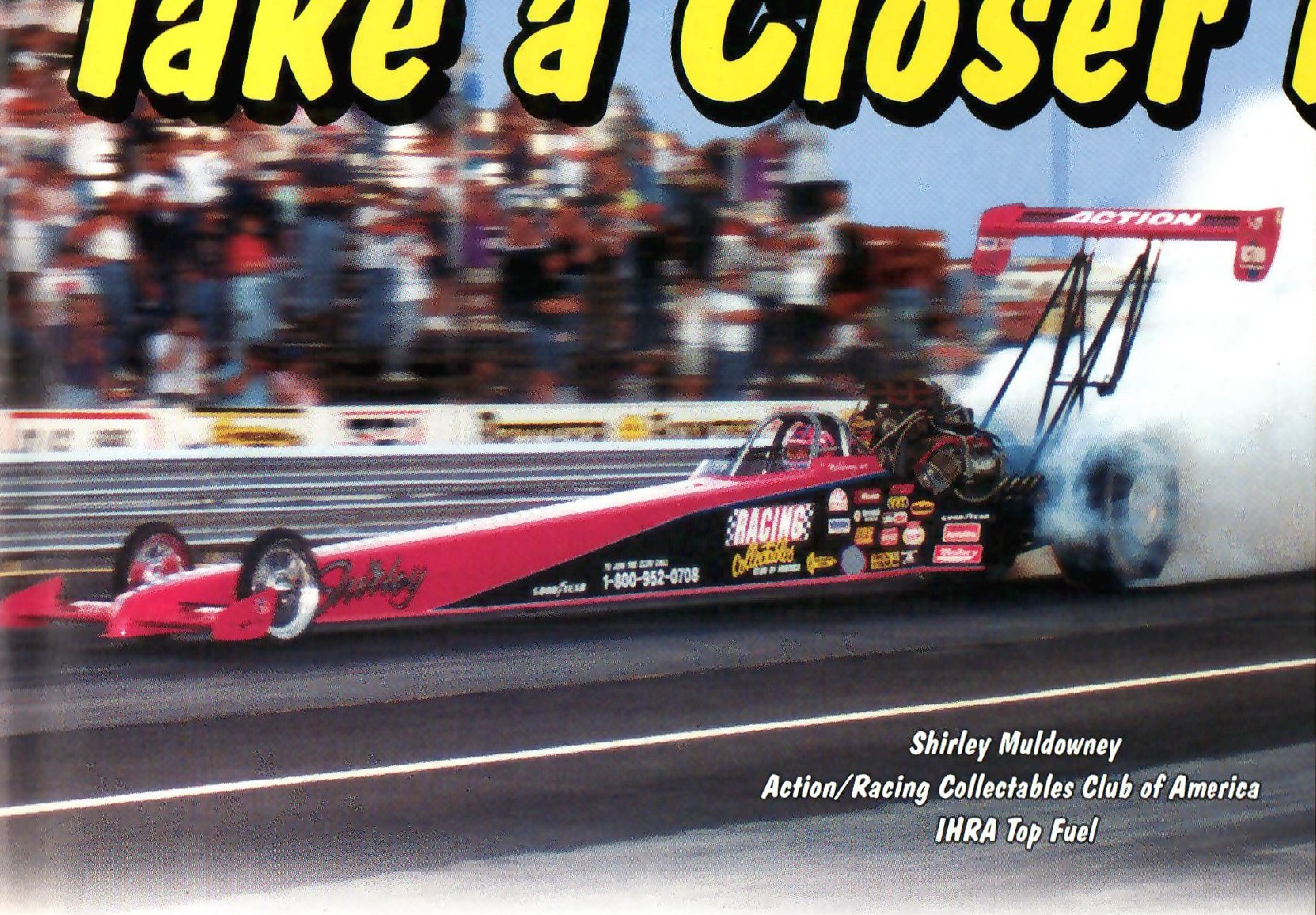
If Andy Warhol was right when he said, "Everybody in the world will have 15 minutes of fame," what you see here is this guy's shining moment. Bob McClurg captured this "little guy" heading skyward in his B/A Anglia at the 1970 AHRA Winternationals, held at Beeline Dragway outside of Phoenix, Arizona. Bob was shooting his trusty Hasselblad medium-format camera with a 250mm Tele-Tesar lens, set at 500 sec. At f5.6, using Kodak Ektachrome-X 120 film. Long live Anglias!

Take a Closer Look!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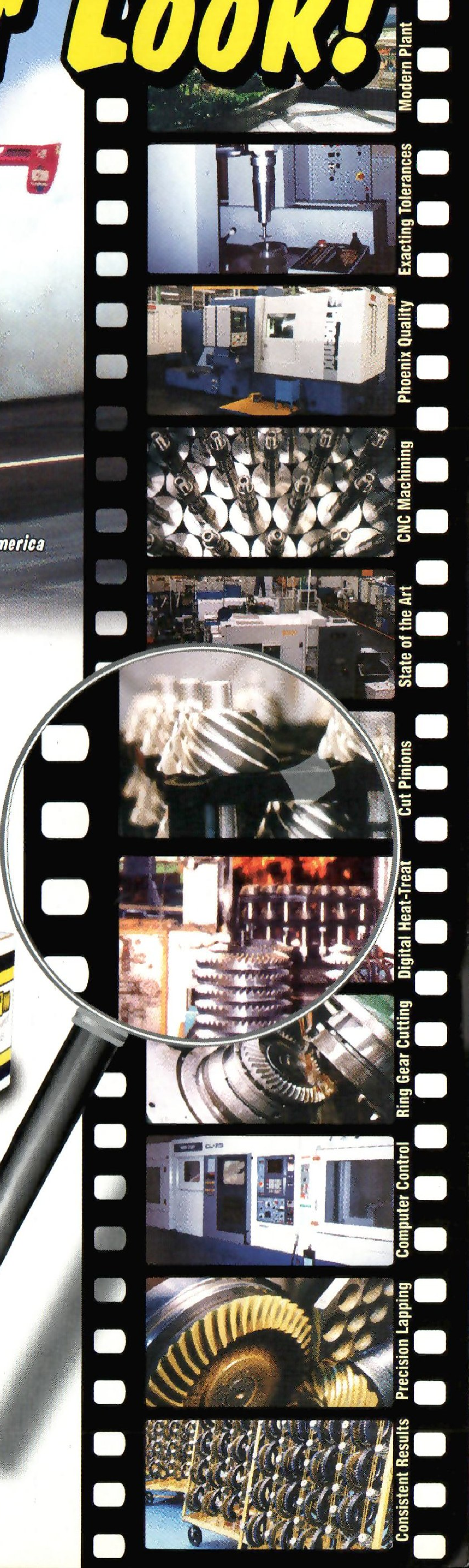
IHRA Top Fuel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